UNIVERSITY
OF OULU

Legal regulation in empirical research in the Information Systems Basket of 8 Journals – a systematic literature review

University of Oulu
Faculty of Information, Technology and
Electrical Engineering
Master's Thesis
Aayush Bhandari
06/19/2023

Abstract

The core content of the paper lies in exploring how studies in information systems research addresses the topic of legal regulation. This study intends to fill the main gap in knowledge by aiming the empirical studies within basket of 8 journals that studies legal regulation. The results of this study provide perspectives on specific legal regulations, the research methodologies employed in empirical studies, and the theoretical foundations of the policy cycle stages to which these studies belong. This research identifies and presents a general overview of the trends in the information systems domain.

This thesis utilizes a systematic literature review to discover, examine, and extract empirical studies relevant to legal regulation from a basket of eight journals. The data were obtained from the SCOPUS database, resulting in 351 studies. Through the inclusion/exclusion criteria, 33 primary studies were identified that were relevant to the focus of the study. These primary studies focused on various legal regulations and were subsequently classified into four themes: impact, implementation, compliance, and policies. These themes allow for the identification of trends and the scope of the primary studies that investigate legal regulations. Furthermore, these themes are further analysed and classified into sub-categories to provide a more detailed analysis of the primary studies.

The results of the study indicate that many primary studies within the empirical research follow qualitative research methodology. Among these primary studies, the legal regulations most frequently examined are from the United States. Several studies focus on regulations such as the Sarbanes-Oxley Act, High-Frequency Trading Act, and the Health Insurance Portability and Accountability Act. Following the United States, the study finds that primary studies also explore legal regulations in Europe, with a notable emphasis on the General Data Protection Regulation and the Markets in Financial Instruments Directive. However, the results also highlight that many primary studies belong to the implementation phase of the policy cycle stage, while none specifically focus on the problem identification stage.

The findings of the study broaden the opportunity to investigate how legal regulation has been addressed in journals beyond the selected basket of eight. Additionally, since this paper focuses solely on empirical evidence, most primary studies relied on qualitative research methodologies. This suggests the potential for exploring other studies that utilize methodologies such as design science or theoretical analysis.

Foreword

Contents

Figures:

Tables:

Abbreviation

IS	Information System
SLR	Systematic Literature Review
EU	Europe
GDPR	General Data Protection Regulation
SOX	Sarbanes Oxley Act
MIFID	Markets In Financial Instruments Directive
HFT Act	High Frequency Trading Act
ISJ	Information Systems Journal
ISR	Information Systems Research
JIT	Journal of Information Technology
JSIS	Journal of Strategic Information Systems
EJIS	European Journal of Information Systems
JAIS	Journal if Association for Information Systems
JMIS	Journal of Management Information System
MISQ	Management Information System Quarterly
CJA	Criminal Justice Act
STP	Straight Through Processing
II	Information Infrastructure
CDA	Communications Decency Act
CAB	Civil Aviation board
COC	Convention on Cybercrime

PSRB	Pro-Social Rule Breaking Behaviour
IMS	Investment Management System
NIST	National Institute of Standards and Technology
PCI-DSS	Payment Card Industry Data Security Standard
CB	Cyber Regulations
SP	Security Policies
KM	Knowledge Management
EHR	Electronic Health Record
HHS	Health and Human Services
PIA	Privacy Impact Assessment
SAD	Single Administrative Document
NCTS	New Computerized Transit System
SME	Small and Medium Sized business
DBE	Digital Business Ecosystem.
EDI	Electronic Data Interchange
SMTP	Simple Mail Transfer Protocol
EDIFACT	Electronic Data Interchange for Administration, Commerce and Transport
IOS	Interorganizational Information Systems

1.   Introduction

Regulations are rules enacted by federal or state agencies with a primary purpose of controlling a system or a government (Regulation Definition and Meaning | Collins English Dictionary, 2023). Legislators delegate authority to agencies to create and pass regulations. These regulations have same authorities as legislation and are considered primary source of law. Laws are a collection of regulations made and enforced by governmental bodies to control behaviour (Wikipedia contributors, 2023c; Crimes Against Humanity, 2005). Similarly, legislation, as defined by (Legislation, 2023) is a law or set of laws proposed by a government and formally enacted by a parliament.

Legal systems and their terminologies can exhibit significant variations across multiple countries. As an example, Europe where civil law systems are prevalent, represent regulations as binding legislative acts while directives as legislative acts that provide goals for all EU nations to fulfill. (Types of Legislation | European Union, n.d.). In Europe, civil law systems are identified by legal codes that establish distinct legal concepts and procedures. (Wikipedia contributors, 2023a). On the contrary, the United States abides by a common law system built on case law (U.S. Senate: Laws and Acts, 2019). Within these common law judicial systems, laws are developed from uncodified case laws beginning from judicial decisions where courts have an important role in defining the law (Wikipedia contributors, 2023a). Similarly, U.S. Senate: Laws and Regulations (2023) defines "Acts" as individual laws arranged by subject in United States Code. Regulations, on the other hand are "rules made by executive departments and agencies and are arranged by subject in the code of Federal Regulations" (U.S. Senate: Laws And Regulations, 2023).

Furthermore, between these systems legislative practices of different processes differ from one another. In the US, both the Senate and the House pass identical bills that requires presidential signature for identical bills to pass into law (U.S. Senate: Laws And Acts, 2019). Contrastingly, European legislative process allows public policies to be chosen through the legislative method, which contains the European Parliament, the council of EU and European Commission all parties coming to an agreement on legislation (Policy, Law - Decision-making Process | European Union, n.d.).

Likewise, public policy varies depending on geography. In the USA, public policies encompass all decisions made by the federal government, with the executive branch being the principal body through which policies are implemented (Wikipedia contributors, 2023b). In Europe public policies are established by ordinary legislative processes, a process in which the European parliament, which represents EU citizens, the council of EU, which represents EU governments and the European commission, which represents the EU's overall interests, reach an agreement on legislation (*Policy, Law – Decision-making Process | European Union*, n.d.).

These differences in legal systems and processes result in variations in the meanings of terms such as "regulation", "law"," legislation"," Act". Hence, for this thesis, they are all collectively referred to as "legal regulation."

The field of information systems has a long-standing tradition of studying legal regulations and their implications. With the progress of the fourth industrial revolution and the rise of advanced technology and digital innovation, the use of regulations has been widespread across organizations in various domains where information systems are utilised. This ever-evolving nature of technology in the academic research has brought

forward the ethical and legal implications of regulations in the information systems domain.

For instance, laws governing data breach notifications and financial regulations play a crucial role in information systems development by design and execution. These legal frameworks, including which includes legislation, policies, regulations, and laws outline the requirements and procedures that organizations must adhere to. They aim to ensure compliance, protect the rights of individuals, fulfil existing gaps, and identify and mitigate risks. Therefore, studying the impact of regulations and their role in information systems research is important.

Legal regulations have a substantial impact on the formation and utilization of information systems. Organizations are subject to the influence of legal regulations and must ensure adherence to various regulatory obligations. Within the field of IS, extensive research has been conducted types and aspects of legal regulations. However, this study synthesizes previous studies to better understand how legal regulations have been addressed or studied in IS research. This thesis aims to explore the empirical academic research that examines the topic of legal regulation within the domain of information systems. The primary focus of this paper is to analyse a specific basket of eight journals in the IS field that empirically investigate legal regulation.

The main research question addressed in this thesis is as follows:

RQ1: How has empirical research in the field of IS examined legal regulation?

To answer this research question, the following sub-questions were used.

What specific legal regulations have been mentioned or studied in empirical IS research on legal regulation?

What research methods have been employed in these studies?

In which stage of the policy cycle does these research studies fall?

To explore this research question, a systematic literature review was conducted, specifically focusing on the empirical studies in the field of IS. The review concentrated on publications from basket of eight selected journals. This thesis utilizes a systematic literature review method to discover, examine, and extract empirical studies relevant to legal regulations. The SLR helps synthesize current state of knowledge, identify knowledge gaps, and reach in-depth conclusion about existing literature on a provided topic. The SLR framework provided by Okoli (2015) was followed in this study. The objective was to identify and categorise IS research studies that study legal regulation, examine the research methods utilised and determine the stage of the policy cycle that these studies align with, guided by the principles outlined by Anderson (2014).

The upcoming sections of this thesis are organised as follows: Initially, a literature review is provided, focusing on a theoretical model, which utilizes policy cycle stages to define the structural categories for analysis. The methodology employed in this study is then described. Secondly, the findings are explained and analysed, and the research concludes with a discussion of research limitations and future directions.

2.　　Related Research – the policy cycle

In this part, I will outline the basis in the context of the policy making process as seen in Figure 1. "The policy cycle" is a standard approach of studying and engaging in public policy that involves stages. This cycle describes how a public policy is formulated, and how it is implemented. This model helps summarize how IS research has addressed policy cycle which is explained according to the stages in discussion section.

Policy cycle is used to examine the relationship between policy production and policy practice. According to Bridgman and Davis (2003), a policy cycle is a concept that helps us understand the life cycle of a policy. It provides structure by making sense of policy processes. The policy cycle helps organize observations into familiar patterns (Bridgman & Davis, 2003). It is more of a guideline than the reality of how policies are made, but it does influence the way political scientists have generally viewed policy. Hence, stage-by-stage analysis of policymaking is a common approach for studying it. Although the phases have transformed through time and the practice also differs per nation, the fundamental concepts have not been altered. Initially, the policy cycle was formed as a theory based on the work of Harold Laswell, who splits the cycle into seven stages. (Wikipedia contributors, 2023; Braman, 2003; Lasswell, 1951). Similarly, Bridgman and Davis (2003) used the similar steps as provided by Lasswell but with multiple iterations of how policy is made and understood to cater problem of writing food nutrition policy strategy for 'Queensland Policy Handbook'. The cycle followed by Bridgman and Davis (2003) consisted of 8 stages which were iterative and not meant to be diagnostic or predictive. On the other hand, Anderson (2014) uses a policy cycle model with five stages that helps us identify the distinct stages to develop further theoretical enquiry that examines public policy. Hence, this thesis uses the concept of policy cycle provided by (Anderson, 2014). It explains how a problem evolves from an original concept into a policy, and how the implementation and evaluation of that policy generates new policy concepts.
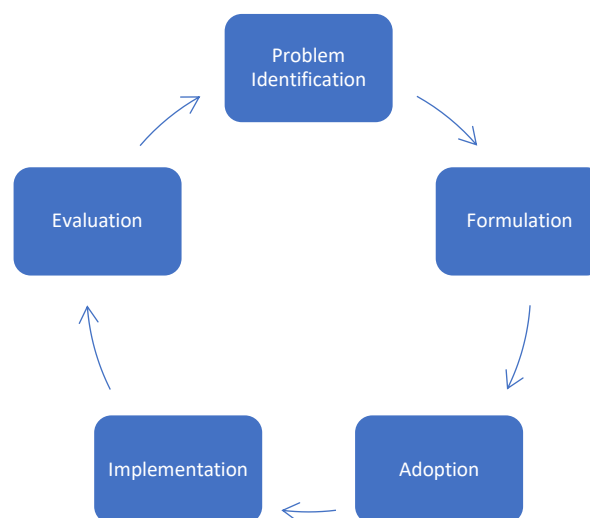

Figure 1 Policy cycle as followed by Anderson (2014).

1. Problem Identification or agenda setting:

This cycle initiates with the phase of identifying the problem. The major priority here is to define the issues or problems for policy making. Recognizing a problem implies that it has been identified as a social issue, and that the case for government involvement has been made. In the second step, setting an agenda leads to the selection of various problems. Agenda Setting is a method of organizing the policy issue in relation to prospective approaches and tools that will influence how a policy is developed in the other phases of the policy cycle (Jann & Wegrich, 2007).

2. Formulation:

The agenda items are developed into policy proposals. This phase brings out many actors such as stakeholders, regulators, legislators, bureaucrats, governments, experts, who participate in the formulation process. During this stage, the actors collaborate to create a draft as to how a particular issue can be addressed, which has already been set in the previous agenda cycle. According to Anderson (2014), this phase comprises the formulation, identification, and execution of recommended courses of action or choices, for addressing public issues. Anderson (2014, p. 3) contends that this stage resolves problems such as: "Who participates in policy formulation? How does a problem get on agenda of a government?"

3. Adoption:

This phase involves selecting the preferred alternative, including the option of taking no action to address the problem. Subsequently, the policy formulated by the relevant actors is ratified and legitimized by passing through an appropriate legal channel. Anderson (2014, p. 3) argues that this phase helps in answering issues such as: "How is a policy alternative adopted or enacted, are there any prerequisites to be met, who are the adopters, what is the content of the adopted policy?"

4. Implementation

In this phase, the policy is put into practice. Once the policy has been passed, it must be implemented so that the beneficiaries can benefit from it. Jann and Wegrich (2007) indicate that the implementation process follows the historical course of a particular policy and aims to assess the extent to which the centrally set goals and objectives are achieved during implementation. Anderson (2014) also mentions the major focus is on carrying out or applying the adopted policies. Anderson (2014, p. 5) argues that the implementation phase helps answer questions such as: "How does implementation help to shape or determine the content and impact of policy?"

5. Evaluation

This phase determines whether the policy has achieved its objectives. During this stage, the target groups are asked to what extent they have benefited from this policy. Anderson (2014, p. 5) mentions that the evaluation phase helps answer questions such as, "who benefits and who suffers as a result of a policy."

3.   Research Methodology

This section explains all the steps involved and actions performed during this research. This thesis employed a SLR methodology to investigate and present findings on a specific research question concerning legal regulation within information systems. The focus was on studying information systems published in a basket of 8 journals.

"A SLR is a systematic, comprehensive, and reproducible method for identifying, evaluating, and synthesizing the existing body of completed work (Okoli, 2015)". This systematic literature review follows guidelines provided by (Okoli, 2015). According to Okoli (2015), there are various motivations for undertaking SLR. Among them, SLR's, as opposed to conventional literature reviews, are better at finding research gaps in the literature and providing objectivity to the research. This approach provides a foundation for a specific area of research and provides essential suggestions for both present and future research directions. The use of SLR method is an essential approach to identify research patterns. The patterns identified through SLR relating to study of information systems published in basket of 8 journals have been further explained in other sections throughout this paper.

3.1   Specifying the research question:

This is one of the most important phases in any research. This process involves defining the precise problem or topic which the research will investigate. It helps to identify the main research question that the research is trying to address. The primary question addressed in the present article is:

RQ: How has empirical IS research studied the legal regulation?

This research seeks to answer a specific question through literature review. The major focus is on how the topic of "regulation/law" has been addressed/studied in the information system discipline. As a result, the research question (RQ)'s objective is to:

1. Identify the legal regulation/law/legislation in the paper.
2. Identify specific law/regulation addressed in the paper.
3. Identify what is being regulated.

3.2   Databases Selection

The common electronic databases recommended for performing an SLR were used in the method of searching to obtain relevant research. For literature searches we utilized the databases available in the library of the University of Oulu. This thesis specifically utilized the SCOPUS database.

This study focuses solely on empirical research to study the mention of legal regulation in IS research. Any study whose findings are based exclusively on actual, observable facts is considered empirical research. The term "empirical" often refers to research that is based on scientific experiments and/or data by scientific experimentation and/or data (Bouchrika, 2023). It is a research method that collects data using quantitative and qualitative methodologies to explore its assertion. Qualitative research techniques are utilized for gathering non-numerical data, and quantitative research methods are used to collect numerical data.

Furthermore, this thesis also uses a real-life regulatory consideration as a criterion for empirical study. We want to focus on studies conducted within or considering a concrete regulatory context, such as a specific law or type of law in a specific country. Some detailed indications for real-world context of legal regulations include: if a regulation is mentioned that is specific to a country, if it concerns a specific industry/sector, if it concerns a specific aspect being regulated (for example, data protection regulation), or if a specific law/regulation/Act is mentioned. (Example: GDPR, SOX)

3.3 Search String

Initially, a comprehensive literature search is performed in SCOPUS to gather relevant publications that match the key phrases ("regulation" OR "law" OR "legislation" OR "legal" OR "legisl*" OR "regulat*" OR "public policy").

The Boolean operator 'OR' is used to combine the two search strings. The use of search techniques inside quotation marks is employed because various databases respond to search terms differently. When not enclosed in quotation marks, words like "public policy" that are meant to act as a just one search query may be treated as two independent key phrases. Similarly, an asterisk (*) is used to represent variations of the root words in the search results. For example, the search phrase "legisl*" might return results including the keywords "legislation", "legislative", "legislate", and so on. As a result, using the symbol (*) broadens the scope of a search query, gathering a diverse variety of relevant results.

Later, the initial search area was expanded using a structured search query with the addition of other Boolean operators "AND", "OR" and brackets as well as narrowing the targeted searches across multiple metadata fields to find relevant articles (as shown in table 1) in the format used by the SCOPUS database. The main aim here is to limit the targeted searches to the title, abstract and keywords. Hence, "title-abs-key" has been used. Similarly, ISSN numbers have been utilized in the search query to ensure that the results include articles published in the specified journals rather than a broader range of publication. Since the paper's focus is on (Basket of 8 journals) which are specified by ISSN numbers indexed in SCOPUS. The 8 journals are: *Information Systems Journal, Management Information Systems Quarterly, The Journal of Strategic Information Systems, European Journal of Information Systems, Information Systems Research, Journal of the Association for Information Systems, Journal of Information Technology, Journal of Management Information Systems.*

The results were chosen and prepared for export in the second phase of work, utilizing the search results obtained from the final search string. SCOPUS was used to extract the results, providing a comprehensive result of searches. All search results were selected and exported, including citation information, bibliographic information, abstracts, and keywords resulting in a total of 351 documents. The files were then exported in RIS format.

The final search string is as follows: *"(TITLE-ABS-KEY ("regulation" OR "law" OR "legislation" OR "legal" OR "legisl*" OR "regulat*" OR " public policy") AND ISSN (13501917 OR 2162-9730 OR 0963-8687 OR 14769344 OR 1526-5536 OR 1536-9323 OR 02683962 OR 07421222))"*

Table 1 Utilized Search Strings

Selected Database	Total Retrieved Articles	Applied Search Terms
SCOPUS	351	(TITLE-ABS-KEY ("regulation" OR "law" OR "legislation" OR "legal" OR "legisl*" OR "regulat*" OR " public policy") AND ISSN (13501917 OR 2162-9730 OR 0963-8687 OR 14769344 OR 1526-5536 OR 1536-9323 OR 02683962 OR 07421222))

The third phase involved streamlining the process of conducting a systematic review. We utilized Covidence, a peer-reviewed, browser-based tool to conduct the SLR because its interface provided a structured way to guide us through the review process. This phase included a rigorous and comprehensive literature search. Additionally, it automatically helped remove duplicate results and facilitated the tracking of papers that were included or excluded at each stage of the review process. Furthermore, this tool assisted in analyzing the relevance of the papers to the research topic at hand.

Covidence allowed us to import articles, initiating the screening process. The screening of the articles was a two-part process, where my supervisor and I determined if each article met the inclusion criteria and should therefore be included in the review. In this case, the screening was conducted in two steps. The first step involved examining titles and abstracts, while the second step involved a detailed examination of the full-text article using eligibility criteria that allowed for inclusion or exclusion.

For the first step, the articles were sorted in alphabetical order based on the author's names. This approach simplified the management of each article for both my supervisors and me. We collaboratively reviewed the first 20 articles, resolving any conflicts that arose equally. I encountered 8 conflicts. Afterward, we both independently reviewed 25 articles in parallel, and in this case, I had 11 conflicts, which we resolved and proceeded further. This process allowed me to independently continue with the remaining articles.

Next, we encountered the task of labelling and categorizing each study in the systematic review. To address this challenge, we utilized tags in Covidence, which enabled us to assign multiple tags to studies. This feature facilitated searching and filtering for specific studies within the review. Tags also proved valuable in monitoring the progress of each article, indicating whether it had undergone screening and whether it was included, or excluded. Table 3 presents a summary of the final inclusion or exclusion status of the articles.

Table 2 Review summary of articles in Covidence

Total articles	351
Duplicate articles	1
Irrelevant articles	140
Articles for full-text review	210

Finally, only 210 articles from basket of 8 were further selected for full text review. Table 3 presents the total count of articles on each basket of 8 journals.

Table 3 Details of total selected articles for full-text review based on individual journals.

Basket of 8 Journals	Total articles
European Journal of Information Systems	22
Information Systems Journal	16
Information Systems research	29
Journal of AIS	22
Journal of Information technology	35
Journal of Management Information Systems	47
Journal of Strategic Information Systems	25
MIS Quarterly	14
Total	**210**

At this stage, the 210 papers obtained were categorized based on their respective journals to enhance the selection process. The articles were organized in a researcher's diary, clearly indicating the legal regulation discussed, the industry it belongs to, and the reasons for including or excluding each article. The researcher's diary served as a tool for tracking the progress across all eight journals and provided an opportunity for reflection on our own assumptions.

The next stage involved conducting a thorough review of the full-text articles to filter out studies that met the inclusion criteria for the study. In this phase, I carefully examined each article to determine its eligibility based on the established criteria. As this stage played a crucial role in the systematic review process, it was important to establish clear inclusion and exclusion criteria for the next phase, as explained in Table 4. These criteria were applied during the full-text review stage to ensure that only highly relevant articles were included in our study.

Table 4 Criterions for Inclusion/Exclusion of papers for full-text review

Inclusion Criteria	Exclusion Criteria
Empirical article	Excluded because not published in targeted forums.
Somehow mention about regulations/Act/legislation	Excluded because not in English
Includes keywords "regulat"," legal"," law"," Act"," public policy", "directive"," Legis", "statute"	Excluded because not full article (excluding short paper, research in progress, editorial, proceeding paper, conference paper, teaching case, panel discussion, survey paper and working paper)
Include if it has a real-life regulatory context (The law/regulation mentioned, the industry sector; the country in which the regulation is mentioned, or similar)	Excluded because no keywords detected.
	Excluded because not in scope
	Exclude because no specific rule/regulation mentioned.
	Excluded if no empirical data evidence was shown.
	Excluded because no full text recovered.
	No real-life regulatory context

Based on the above criteria, Table 5 provides details of how many articles were excluded and for what reasons among 210 articles. In total, 110 articles were excluded, resulting in a remaining set of 100 articles for review. The purpose of this review was to determine whether the empirical study focused specifically on legal regulation or if a specific legal regulation was only mentioned as an example in the study without the empirical study itself addressing legal regulation in a meaningful way. Through this full-text evaluation, we identified 33 studies that met the criteria of empirically studying aspects related to legal regulation. These 33 studies constitute the primary studies included in this systematic literature review (SLR).

Table 5 Details of excluded articles from full-text review

Exclusion criteria	Total numbers of articles excluded
No full text recovered articles	16
Articles not empirical	21
Articles out of scope	10
Articles Unavailable	2
Only appendix	1
Special issue	4
Survey Paper	1
Working paper	3
Articles Irrelevant	1
Editorial	2
Empirical but no real-life regulatory context	44
Case Study	1
Not specific to any law/regulation/Act	3
Regulation mentioned as 'self-regulation' or 'self-regulatory'	1
Total	**110**

3.4   Data Extraction

All thirty-three (33) primary studies that were identified in the previous quality assessment step went through data extraction. This step involved reading the complete text of each research article and documenting the necessary data in a templated form within an Excel sheet. The form was designed to facilitate the identification of answers to the research questions, ensuring that comprehensive and detailed information about each study was collected. Each primary studies data was retrieved, documented, and stored in the appropriate sections. The following information was gathered for each research article.

- Excel article number
- Name of pdf file stored.
- Journal
- Year
- Authors

This data extraction phase occurred in two stages. The following information was derived from the research findings of the studies for phase 1:

- Legal regulations that have been directly focused.
- Some other legal regulations that are mentioned in the article are not on direct focus.
- Unspecific references to large number of legal regulations, or industry-mentioning regulation that is not extremely specific.
- What is the empirical focus of the paper?
- What is the regulation about?
- In which context has the regulation been used?

The following information was derived from the research findings of the studies for phase 2:

- Abbreviation form of regulations
- Full name of the regulation
- In which section of the primary study has the regulation been mentioned?
- Is the regulation used as context for the study, as a motivation for the study or does the whole primary study focus on investigating the regulation, its implementation, or its effects?
- Which country/region is the specific regulation effective in?
- Which industry/Sector specific regulation has been mentioned in?
- Categorization of themes of how regulations have been used.
- Type of Information System being studied in the study.
- Enactment Date of Legal regulation.

Here, I followed the procedure of directly copying verbatim data for the fields 'What is the empirical focus of the paper' and 'in which context has the regulation been utilized' during phase 1. Similarly, for phase 2, the fields 'Full name of the regulation', 'type of information system being studied', 'in which section of the primary study has the regulation been mentioned' and 'enactment date of Legal regulation' also utilized copying verbatim data for phase 2. This systematic and rigorous approach ensured that the gathered data effectively addresses the research question.

3.5   Data Synthesis

In this step, data synthesis involved systematically gathering and synthesizing specific findings obtained from primary studies, to supply answers to the research question addressed by the SLR. In this stage, I aimed to explore and group the primary studies based on their descriptions to answer the questions of "what" legal regulation acknowledges in IS research and "how" it addresses legal regulation. I achieved this by categorizing the data into smaller groupings that I will describe in greater detail in the following step of the SLR process. Therefore, the outcomes of the synthesis step were to extract the data using extraction template provided by my supervisor during my research traineeship and prepare the data for future analysis based on an iterative approach.

3.6   Reporting the review

An SLR reaches its final stage at this point. Reporting the results and drafting the review itself are the last steps in constructing a research literature review (Okoli, 2015). Section 4 involves presenting the findings after examining the selected (Kitchenham & Charters, 2007). The data was combined, and the conclusions from each study's findings were

documented and organized in a logical order, along with descriptive themes that will be discussed in the next section.

4. Findings

In total, 33 empirical studies from the basket of 8 information systems journals have been selected and further analysed as they met the study criteria. From this point onwards, all the primary studies will be referred to as (PS1) …(PSN) (Appendix A consist of the list of all primary Studies)

This section includes a basic overview of the research, as well as a synopsis of specific studies. Firstly, it discusses the primary studies, highlighting the journals they were published in and the distribution of studies across different years. Secondly, it presents an overview of the research methods employed and the research settings in which the studies were conducted. Lastly, it presents the results that addresses the research question.

4.1 Overview of the studies

This section begins with a summary of the primary studies, by presenting general overview resulted from this study.

Table 6 Distribution of primary studies across Journals.

Journals	Count of papers	Percentage	Reference
European Journal of Information Systems	3	9.09%	PS3, PS4, PS11
Information Systems Research	1	3.03%	PS9
Information Systems Journal	2	6.06%	PS5, PS6
Journal of the Association for Information Systems	2	6.06%	PS24, PS31
Journal of Information Technology	11	33.33%	PS1, PS8, PS12, PS13, PS15, PS17, PS19, PS21, PS22, PS25, PS33
Journal of Management Information Systems	8	24.24%	PS16, PS18, PS20, PS23, PS26, PS29, PS30, PS32
Journal of Strategic Information Systems	4	12.12%	PS2, PS14, PS27, PS28
MIS Quarterly	2	6.06%	PS7, PS10

From the table 6, it can be observed that the Journal of Information Technology has highest number of published studies, accounting for 33.33% of the total studies with 11 articles. The Journal of Management Information Systems follows with 8 articles, representing 24.24% of the total. The Journal of Strategic information Systems has 4 published papers, accounting for 12.12% of the total count. The European Journal of Information Systems has 3 articles, representing 9.09%. Additionally, MIS Quarterly,

Information Systems Journal and Journal of AIS all had 2 articles published, accounting for 6.06% for each journal. Finally, Information Systems Research had only 1 article published, accounting for 3.03% of total primary studies.
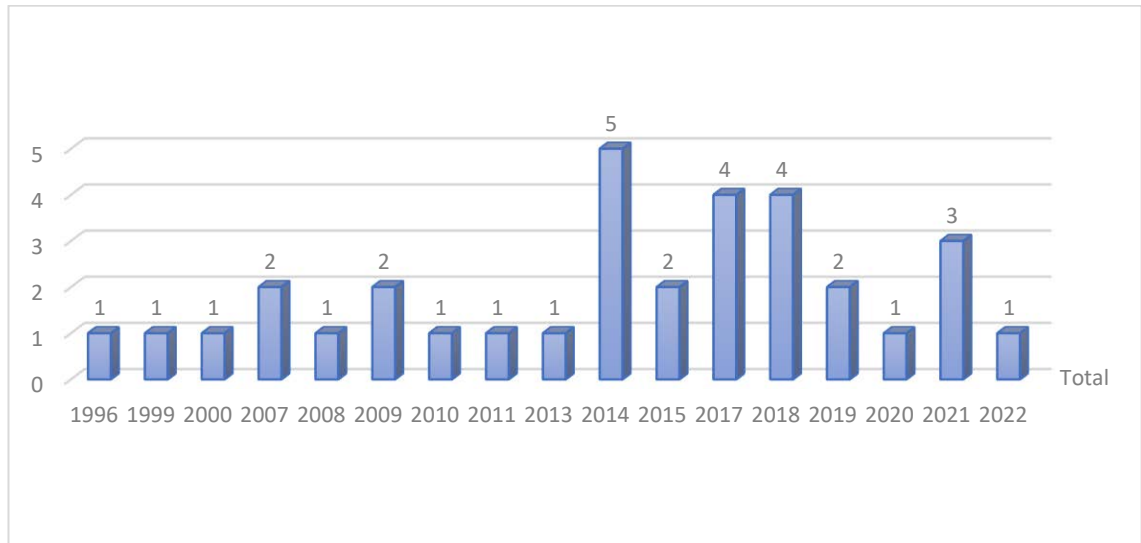
Figure 2 Distribution of primary studies across Year.

Figure 2 depicts the distribution of primary studies from 1996-2022. It can be observed that initially, there were only a few studies published per year. However, in 2014, there was a significant increase in the number of studies. Prior to 2014, only two years 2007 and 2009, had 2 articles published, accounting for 6.06% each. In all other years, one study was published, accounting for 3.03% each.

The highest number of studies, 5 studies accounting for 15.15%, were published in 2014. The trend started to decline from 2014 onwards. In 2015, only two studies accounting for 6.06% were published. The interest in studies increased again in 2017 and 2018, with four studies published each year, accounting for 12.12% each. However, the trend was not sustained, and the number of studies decreased from two per year to one per year by 2020.

In 2021, three studies were published, representing 9.09% of the total studies. However, in 2022, the number of studies decreased again to 3.03%.

4.2 Research methods

This section provides the general overview of research methods utilised by primary studies.
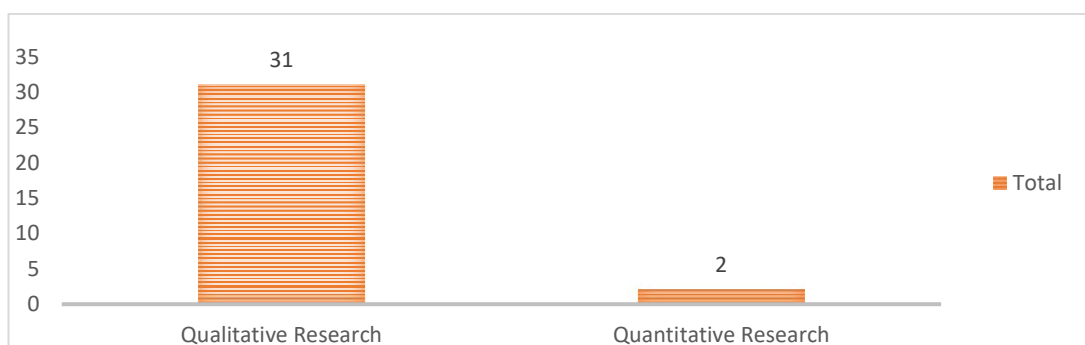
Figure 3 Distribution of research methodology utilised for different journal articles.

Figure 3 illustrates that most studies in the primary sample utilised the qualitative research method to study legal regulation. Out of total studies, 31 articles (94%) employed qualitative research methods. In contrast, only 2 articles (6%) utilised quantitative research method.
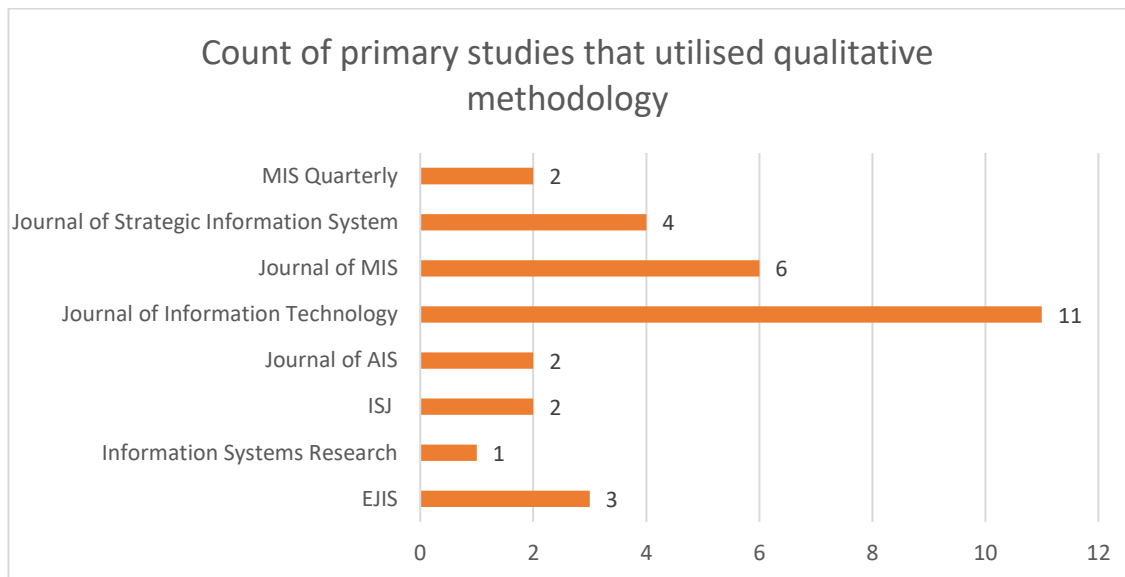
Figure 4 Distribution of Qualitative research papers based on Basket of 8 journal.

Figure 4 illustrates the distribution of articles among the basket of 8 Journals. The Journal of information technology has the highest number of articles, accounting for 35% of the total studies with 10 articles. The Journal of MIS follows with 19% of the total studies, comprising 6 articles. The Journal of Strategic Information Systems accounts for 13% of total studies with 4 articles. The European Journal of Information Systems represent 10% of the total studies with 3 articles. The Journal of AIS, Management Information Systems Quarterly and Information Systems Journal each have 2 primary studies, contributing 6% to the total studies. Finally, Information Systems Research has 1 article, accounting for 3% of the studies and following a qualitative research methodology.
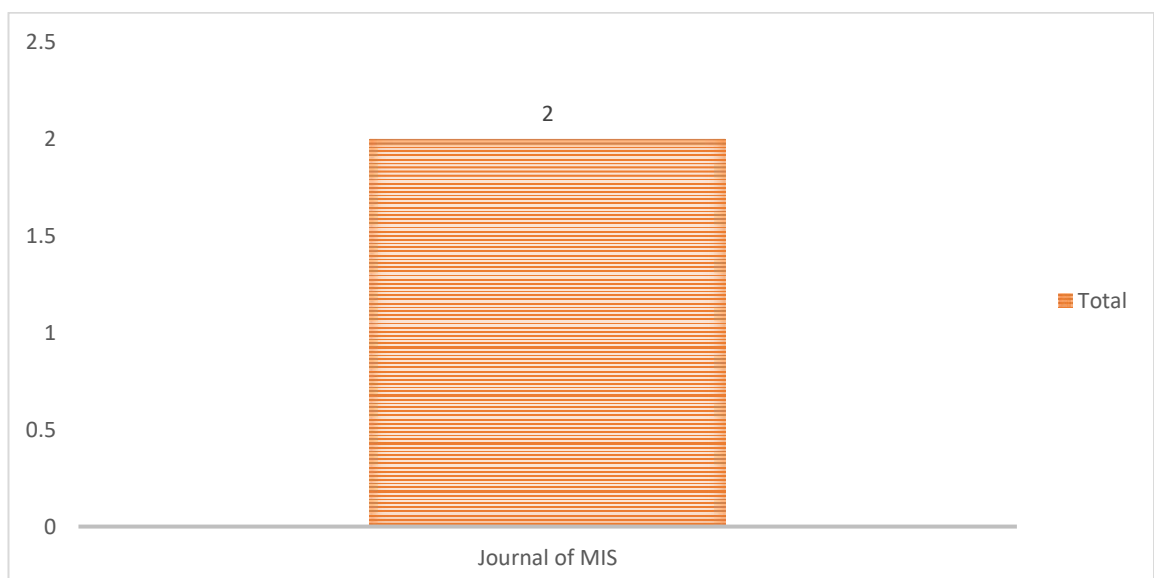
Figure 5 Distribution of Quantitative Research papers based on each basket of 8 journals.

Figure 5 illustrates the Journal of MIS, which includes 2 qualitative studies selected as primary studies among the basket of 8 journals.

4.3 Descriptive Summary of specific laws and regulations addressed or referred to.

This section provides a summary of the legal regulations addressed in the primary studies. The following data were extracted and organised in Microsoft Excel to create the summary of regulations studied in the selected studies.

- Abbreviation form of regulation
- Country where the regulation is from
- Full Name of the regulation
- Primary Studies

Table 7: Tabular description of legal regulations mentioned in primary studies.

Abbreviation	Full-Name	Studies in which the regulations have been mentioned in
US		
HFT regulation	High Frequency Trading Regulation	PS1, PS13
Securities Act	Securities Act	PS1
SOX	Sarbanes-Oxley Act	PS2, PS11, PS12, PS31
HIPAA	Health Insurance Portability and Accountability Act	PS3, PS6, PS10, PS18
CDA	Communications Decency Act	PS8
DFA	Dodd-Frank Act	PS9
	Breach Notification Law	PS10
HITECH	Health Information Technology for Economic and Clinical Health Act	PS10, PS18
CCPA	California Consumer Privacy Act	PS11
GLB	Gramm-Leach-Bliley Act	PS11
HFT Act	High Frequency Trading Act	PS13
JOBS	Jumpstart Our Business Startups Act	PS16
WCA	Wire Communications Act	PS21

CFAA	Computer Fraud and Abuse Act	PS23
SPA	Safe Port Act	PS21
LARA	Lawsuit Abuse Reduction Act	PS24
	Antitrust law	PS26
ADA	Airline Deregulation Act	PS27
CAA	Civil Aeronautics Act	PS27
	Anti-offshoring Legislation	PS28
CAJOA	Creating American Jobs and Ending Offshoring Act	PS28
FISMA	Federal Information Security Modernization Act	PS29
FCPA	Foreign Corrupt Practices Act	PS30
EU		
	EU Data Protection Directive	PS4
	Tendering legislation	PS5
GDPR	General Data Protection Regulation	PS11, PS15, PS25
MIFID II	Markets in Financial Instruments Directive II	PS12, PS15, PS17
MIFIR	Markets in Financial Instruments Regulation	PS13
	Transit goods regulation	PS14
	EU Law	PS14
	Financial Market Regulation	PS15
MAD II	Market Abuse Directive	PS17
	Telemedicine Regulation	PS20
	EU directives	PS22
AMLD5	EU Anti-Money Laundering Directive	PS25
PSD2	Payment Services Directive	PS25
EFSEA	Electronic Financial Services Efficiency Act	PS33
France		

COC	Convention on Cybercrime	PS7
South Korea		
PIPA	Personal Information Protection Act	PS6
Taiwan		
	Taiwanese Regulation	PS3
United Kingdom		
CJA	Criminal Justice Act	PS19
POA	Prosecution of Offences Act	PS19
General		
	Governmental Regulations	PS2, PS16
	Privacy regulations	PS2,
	auditing regulation	PS2,
	Cyber Regulation	PS11
	Financial Regulation	PS12, PS13, PS15
	Banking Law	PS15
	Security Regulation	PS18
	General Data Security Legislation	PS20
	General Liability Legislation	PS20
	Contract Law	PS22
	Database Legislation	PS23
	Intellectual Property laws	PS23
	Database Regulation	PS23
	Common Law	PS24
	Civil Law	PS24
	Patent law	PS26
	Privacy Act	PS29

	Privacy Legislation	PS32
	Internet Legislation	PS33
	Privacy Act	PS29
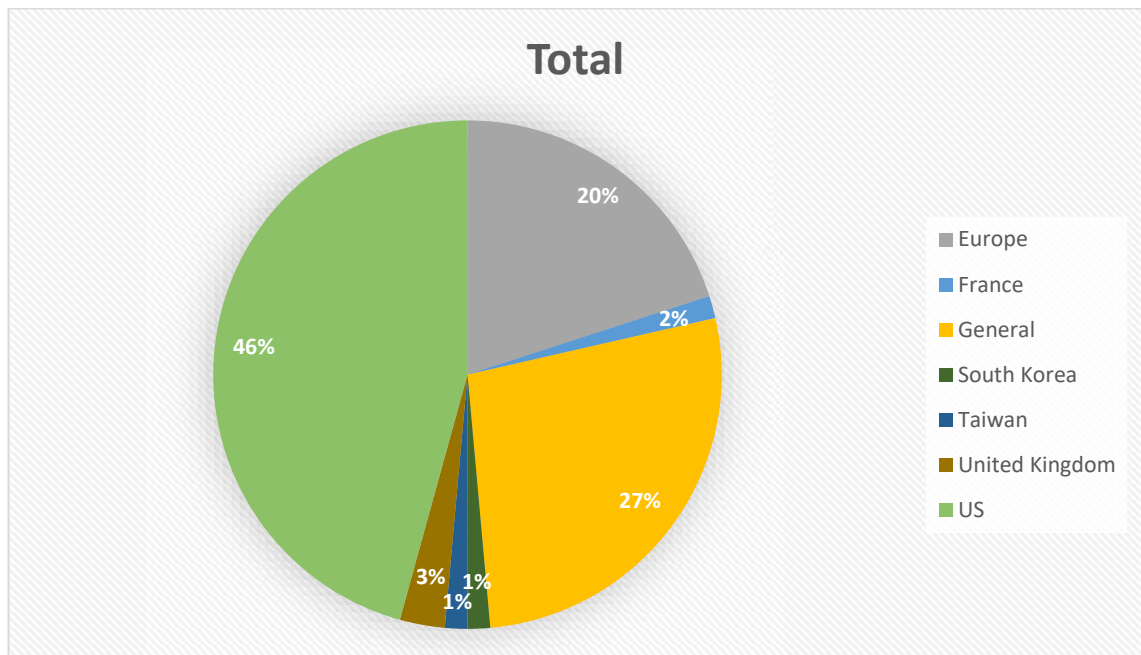
Figure 6: Distribution of implemented legal regulation based on nations of primary studies.

Figure 6 illustrates that the United States has the highest number of empirically studied legal regulations in IS research, accounting for 46% of the total. This is followed by 27% of general legal regulations which include common regulations such as Banking regulation, privacy legislation, auditing regulation that cannot be individually categorised as they have similarities across the globe. (More details of this category are provided in Table 6). Among the studies, 20% of legal regulation are from Europe, while 3% are from the United Kingdom. Additionally, 2% of the total studies are from France. Finally, legal regulations from Taiwan and South Korea accounts for 1% of studies in empirical IS research.

4.4   How has empirical IS research studied the phenomenon of regulation?

This section provides an answer to how empirical IS research has studied legal regulation. The phenomenon of regulation has been empirically studied in various ways. This thesis groups the studies into 4 broader themes that offer a common perspective on the research question. The themes are **Impact, Implementation, Compliance, and Policy.** Under each theme, there are multiple sub-categories that define how these studies address regulation. The detail of all the themes and their sub-categories are provided in a tabular form following each theme.

4.4.1 Theme 1: Impact

Table 8: Primary studies belonging to the Impact theme.

Theme	Sub-category	Primary Studies
Impact	Studies studying the effectiveness of regulation and ways to improve how different types of organizations operationalize regulations, as well as examining the principles and policies surrounding regulations and how they function within organizations.	PS9
	Studies can explore how different regulations affect the behaviour of organizations and individual	PS1, PS26, PS28, PS12, PS13, PS16, PS20, PS8, PS24, PS27, PS29, PS32, PS10, PS21

There are 15 studies which fall under this theme. Among them, 14 study utilize qualitative research methods. Researchers within this theme have mostly used qualitative research methods like interviews, case studies and surveys. These qualitative methods help generate more detailed information about the impact regulation creates on policy regimes, organizations, industry, and individuals. On the other hand, 1 study utilises quantitative research. There are two sub-categories within this theme.

Sub-category 1: Studies on the effectiveness of regulation and their impact on organization
Under this sub-category, there are **studies that focus on the effectiveness of regulations and how they function within organizations.** These studies aim to identify ways to improve the understanding of how regulations operate within organizations and explore opportunities for improvement.

For example, De Vaujany et al.'s article (PS9) examines the effectiveness of regulations and explores ways to enhance how different types of organizations operationalize regulations, their principles, and policies. The author discusses the potential of IT-based regulation, which introduces new forms of interactions and regulatory practices. The paper specifically discusses the *Dodd-Frank Act,* which mandated complicated IT-based regulatory structures for trading equities and associated methods of accounting in financial services sector, resulting in substantial regulatory practices.
The study emphasizes the importance of studying information systems and technology as an integral component of regulatory systems, as they can enable and support regulatory practices within organizations. The paper argues that information systems play a crucial role in organizational regulation by facilitating the development, implementation, and enforcement of rules and practices.

Sub-category 2: Studies on the effect of regulation on behaviour of organizations and individuals

Under this sub-category there are **studies that explore how different regulations affect the behaviour of organizations and individuals**. Researchers within this sub-category aim to understand the impact of regulations, regulatory frameworks, or policy regimes on organizations, industries, and individuals.

For example, Cooper et al. (PS1), examines the trend of financialization, with a special emphasis on High Frequency Trading (HFT) and its role in facilitating financialization. HFT involves the use of advanced algorithms and technology to execute trades at high speed and high volume, which can significantly impact market efficiency. The author discusses how regulations in the finance industry have contributed to the increased processing of information in all markets.

The paper highlights the trend of financialization, which started around 1990 when traders were encouraged to use computers for automated trading systems. In response to the automation in trading, regulatory measures such as the *Regulation National market System* in the US and *Markets in Financial Instruments Directive (MiFID)* in Europe were introduced. These regulations encouraged the utilization of electronic devices when it came to financial trades and allowed improvements in technology, which performed an important part in the rise of financialization.

The study emphasizes that HFT has a direct effect on long-term investors and markets. The author traces its foundation in the US back to *Securities Act of 1933* following the market crash of 1929. The paper acknowledges the importance of stable regulations to ensure market stability and transparency, as any changes in the information technology or regulations can impact market liquidity. Conflicts between HFT and traditional market makers (LFT's) can have negative impacts on long-term investors. The article suggests that strong regulations can help mitigate conflicts between HFT and traditional market makers. Overall, the study provides a foundation for discussing the trend of finance impacted by stronger regulations, which has resulted in increased information processing in all markets.

Similarly, another article by Thatcher and Pingry (PS26) provides a recent empirical research of software patents to investigate three elements that have contributed to the rise in software patent propensity throughout the years. One of the criteria mentioned by authors focuses on the encouragement of patent rights growth by increasing their effectiveness and accessibility The article discusses how recent developments in patent law have made software patents most cost-effective. These advancements have simplified the process of obtaining *patent law*.

Another work by, Khan and Lacity (PS28) investigates how firms deal with anti-offshoring pressures in computer technology and solutions for business processes. The paper investigates the factors that influence organizational reactions to anti-offshore pressures from institutions, such as the distinctive characteristics of such pressures and organizations' prior experience with offshoring. The article discusses the existence of anti-offshoring legislation, and the ongoing debates surrounding its appropriateness, necessity, and effectiveness. The study also reveals that higher regulatory environment uncertainty reduces organizational responsiveness to anti-offshoring pressures.

Currie et al. (PS12) conducted semi-structured interviews to learn how regulatory technology incorporates monitoring, openness and as well as accountability to achieve compliance requirements before and after the financial crisis. The paper investigates the gradual links and chronological constraints of regulatory events both prior to and following the crisis, as well as their impact on compliance behaviours, using empirical data. This long-term study of the pre- and post-financial-crisis periods provides insights into the evolution of financial regulations and technological advances in the global economy. The article discusses regulatory changes made in the financial markets both before the crisis *(including SOX, and Securities and Exchange Act of 1933)* and after the 2008 financial crisis *(including Dodd-Frank Wall Street Reform Act)*. These regulations aim to impact financial markets and the utilization of technology for regulatory

compliance. The study identifies regulatory tensions that emerged in the financial sector and examines the development of regulatory technologies.

Another article by Currie and Seddon (PS13) discusses the advancement in financial markets through the substitution of manual activities with advanced algorithms in high frequency trading. The paper explores the impact of financialization on the market, which results in reduced latency, lower costs associated with intermediaries, increased liquidity, and greater speed and efficiency in the system processes, all which impact price movements. The authors aim to fill the research gap by connecting High-Frequency trading to the regulation of the finance and the structure of markets.

The major focus of the paper by Currie and Seddon (PS13) is *financial regulation* for understanding High-Frequency Trading. HFT is an element of trading, performed through algorithms that involves two phases of execution. The first phase involves the execution of large order implemented by a computer algorithm to obtain the best price within smaller time frames. The subsequent phase includes algorithms exploring the market for smaller trades rather than executing a predefined bulky order. The article discusses several regulations aimed at increasing transparency measures to enhance automated trading for and prevent rogue algorithms from disrupting market events. These regulations include *HFT regulations, HFT directives and laws, financial regulations and MiFID* which helps to regulate automated trading in the financial sectors. For example, the authors note that regulations, such as the *MiFID II* have introduced new requirements for HFT firms, including the need to obtain authorization and register with regulatory authorities. Additionally, the paper mentions that international financial regulators and policy makers in the US and EU have passed new laws to address HFT loopholes, although there are differences in regulation between the two regions. "The US follows a rules-based approach, while the EU adopts a principles-based system. Both US and EU regulators continue to develop policies to combat market abuse and manipulation associated with HFT" (Currie and Seddon, PS13, p. 3).

Another article by Jiang et al. (PS16) examines the herding behaviour of online P2P lending investors at macro level. The author presents three research questions, one of which aims to examine the impact of regulatory events on investors' herding behaviour in the P2P lending market when governments establish operational criteria and supervision concepts for online P2P lending enterprises. The analysis investigates changes in the frequency of herding effects changes as new restrictions are imposed by the government. The findings indicate that, "regulatory events have a significant impact on the overall number of investors in peer-to-peer lending platforms. This shows that investors have responded with favor to these changes in regulation, and that they have modified their perspectives and actions towards herding correspondingly" (Jiang et al., PS16, p. 25).

The next article by Steinhauser et al. (PS20) discusses on the concept of telemedicine innovation and how it can improve access to overall healthcare sector and quality of care, particularly, in rural areas. The research blends IT innovation adoption and discontinuous innovation research to investigate the respective significance of two factors influencing discontinuous innovation adoption: digital complementary assets and regulatory contexts. The author adopts an empirical approach to answer the research question and test relevant telemedicine applications. The findings imply that because digital complementary assets have better relative advantage, compatibility, trialability, and observability, they can have a favourable influence on the innovation adoption process" (Steinhauser et al., PS20, p7). The research, on the other hand, investigates the influence of regulatory frameworks on the uptake of innovations in the context of European healthcare systems. "As regulatory

pressures and policies pay a vital role in digital age, regulations can facilitate the adoption of discontinuous innovation through promoting knowledge deployment and offering subsidies, standards, and an innovation directive" (Steinhauser et al., PS20, p7).

Another article by, Chan et al. (PS8) systematically examines the connection between prostitution trends and Craigslist's entry. The author mentions that in 2000, Craigslist was one of the largest sites for online advertisement with a section called "Erotic Services" that was later converted to the "adult section" in 2009 where the advertisements related to sexual services were posted. The study highlights how the rise of online advertising has made it easier for sex traders, sex workers and customers to connect for paid sexual encounters. The study provides insights that are practical, actionable, and relevant to policymaking, aiming to reduce the growth of hidden sex trade, with a focus on *section 230 of Communications Decency Act (CDA)*. Overall, the study adds to the literature on societal issues raised using online intermediaries and offers ideas for regulating sex industry in the age of technological advancement.

Similarly, Watson et al. (PS24) utilised a survey method to investigate the issue of opportunism in IS consulting in three nations by investigating different theoretical perspectives in two ways legal or societal constraints. The authors state that legal constraints are typically imposed with the nation's legal system, including civil law being a particularly frequent type of legal system and common law being the basic source of law in the United States. The paper seeks mechanisms that detect and constraint opportunities due to their potential financial and operational impacts. To explain the effects of legal limits on perceived efficacy, the authors additionally give hypotheses relating to information imbalance and both tacit and explicit knowledge building tasks. Because the data was gathered in three countries: the United States, China, and Saudi Arabia, the author also used Saudi Arabian laws that were totally based on religion and are now seen as a blend of civil and religious law.

In other article by Monteiro and MacDonald (PS27), highlights the changes made to the US aviation industry because of the *Airline Deregulation Act of 1978* and the changes to regulations that preceded it. Prior to *deregulation Act*, the aviation sector was highly controlled, lacked competition, and airline management was not compelled to make strategic decisions. However, with reregulation exposing them to a wider range of competitive challenges and possibilities, airline management had to adopt a more strategic decision-making approach to survive in the industry. They had to streamline their processes, improve resource management efficiency and effectiveness, and develop their strategic skills to compete in a fiercely competitive climate. This paper discusses the impact of deregulation on the US airline industry, highlighting how limited control over the factors such as number of flights, type of aircraft, and quality of passenger service hindered managers from creating effective competitive strategies. The Civil Aviation Board (CAB) imposed restrictions on managers' decision making, limiting their ability to make choices that could potentially damage their airline's profitability. As a result, they had little control over the factors that could impact their airlines profitability and gain an advantage over the rivals. This was the impact created by *Deregulation Act*.

In another article by Sen and Borle (PS29) the significance of data breach incidents that happened in US between 2005 and 2012 for all targeted organizations, industries, and individuals is examined. The article focuses on the seven industry sectors where privacy rights are prioritized and explores the severe impact of data breach on an individual, particularly in terms of an identity theft. The study develops an empirical approach to analyse the risk of breaches within industries and use it to predict contextual risk of data breaches. This study demonstrates the frequency of data breach occurrences and the

financial costs associated with the public exposure of computer security vulnerabilities and breaches. In this paper, authors cite studies that investigate computer security breach and the negative financial impact it has created on vendors, market performances, and market values. The author presents studies whose results have examined the impact of laws such as *data breach notification laws*, *computer security laws* - a data breach incident involving personal, financial, or health data, and finally *federal laws, state data breach notification laws, the Privacy Act of 1974, and the Federal Information Security Management Act* - in general, laws enacted by several states in the United States. Furthermore, it utilizes *HIPAA and GLB* as examples of how different federal and state laws manage data protection in various industries, as the dangers of a data breach will most likely vary depending on the industry.

Thatcher and Clemons (PS32) offer the hypotheses and framework for a baseline framework to investigate the impact on decisions made by policy design on market efficiency as implemented by insurance firms. "Here, the author identifies a mechanism through which insurance companies can use applicant's genetic information in the individual health insurance market (IHIM) is protected by *genetic privacy legislation*, that prevents insurance companies from denying coverage to applicants who are genetically predisposed to certain medical conditions" (Thatcher and Clemons, PS32, p. 3).

Finally, an article by Kwon and Johnson (PS10) studies the impact of security investments in the healthcare sector. The study measures the impact based on antecedent factors that lead to security investments in organizations, including previous security failures or external regulatory pressures. This study aims to understand how these factors contribute to improving security performance of healthcare organizations in the healthcare industry. The researchers classify investments in security as either proactive or reactive, depending on whether they occur before or after an occurrence. This categorization helps policy makers and researchers develop effective strategies for improving security in organizations.

In the same article by Kwon and Johnson (PS10), the study's findings suggests that security managers and policy makers should prioritize proactive initiatives over reactive ones to maximize the effectiveness of security investments and improve security performance, considering the rapidly evolving threats and vulnerabilities. The authors also propose that policymakers should prioritize regulations that combine proactive initiatives with external pressure. "For example, mandating a portion of overall IT budget should be dedicated to security should be mandatory while allowing organizations to decide on types of security investments" (Kwon and Johnson, PS10, P. 19). As an alternate, security-specific-financial incentives like those in *HITECH legislation* might be implemented as these incentives could persuade additional businesses to invest, which may have a ripple effect on other investments. The authors also generate a serious concern of healthcare information security breach caused by usage of electronic medical records (EMR) and possible use of patient data for medical or financial identity theft by criminal's identity. As *HITECH Act* is a federal law that provides funding for the adoption of EMR and promotes the use of technology in healthcare, it has led more sensible patient data store electronically making it vulnerable to security breaches. As a result, both federal standards like as HIPAA and HITECH, as well as numerous state governments, have implemented legislation requiring healthcare providers to follow specific rules for exposing vulnerabilities.

Similarly, the final article in this category by Laffey (PS21) presents a case study about an online gambling start-up called as PartyGaming and its attempt to go public by listing it on London Stock Exchange. Because more than half of its revenue was generated in the

United States, where officials witnessed betting as unlawful and feared legal action, there have been ethical issues about the firm. Despite believing that the actions were permitted under US law and asserting that its assets were located outside of US jurisdiction, the company faced significant challenges. As a result, in 2006 the *Unlawful Internet Gambling Enforcement Act (UIGEA)* was added which was added to an unrelated piece of legislation known as the *Safe Port Act*. The consequences of this move were seen soon, as PartyGaming and other firms listed on the London Stock Exchange indicated that they would no longer provide services to US clients. This news also had a serious impact on the share price of PartyGaming dropping it to 58% value on the day this news was circulated.

4.4.2 Theme 2: Implementation

Table 9 Primary studies belonging to the implementation theme.

Theme	Sub-categories	Primary Studies
Implementation	Studies that help in identifying gaps or weaknesses in regulatory framework that may need to be addressed to improve effectiveness.	PS5, PS23, PS25
	Studies the role of institutional and cultural factors that helps in shaping the implementation of regulation	PS2, PS3, PS33

This theme explores the implementation and utilization of regulations in the real world. It includes research which studies about how regulatory requirements are put into practice, including compliance by organizations and stakeholders, as well as monitoring by regulatory bodies. Additionally, it provides insights on paper that addresses the means to improve effectiveness and the factors that shape regulatory implementation of regulation. Research in this theme has utilised qualitative research method. Below sub-categories describe how studies in information system addresses regulation.

Sub-category 1: Studies that help identify gaps or weaknesses in regulation.

This subcategory **identifies research papers that identifies gaps or weaknesses in regulatory framework, aiming to improve their effectiveness.** By identifying common weaknesses, these studies offer policy makers and regulators general insights into the implementing regulatory approaches across different industries or even within the same industry.

Article by Boonstra and Van Offenbeek (PS5) empirically examines *European (Dutch) Tendring legislation,* which governs the procurement process of software packages for public organisations. The *legislation* aims to ensure fairness, transparency, and non-discrimination in selection process. The study seeks to explore how *tendering legislation* shapes a buyer's software selection process through the lens of competing decision-making rationalities (Boonstra and Van Offenbeek PS5, p. 2). This paper also highlights lack of research on the process of public software procurement. This brings an opposing view on the effectiveness of *tendering legislation* in controlling public procurement. The author cites studies from other researchers focusing on specific tasks within the

procurement process who suggests that buyers can manipulate the selection process to favour a preferred supplier while others argue tendering legislation provides suppliers equal chances and facilitates buyers in acquiring software that meets their requirements at the lowest price. Hence, this research contributes to the field of Information system especially on the literature of software selection to address the influence tendering legislation has on how public organizations select strategically important software packages. This study suggests that decision makers need to be aware of the implications of tendering legislation on their ability to align the process towards the organization's goals. Hence, it generates three decision-making rationalities. They are functional, economic, and political. Using these three rationalities the author analyses how *tendering legislation* may shape software selection. The findings of the study by Boonstra and Van Offenbeek (PS5, p. 3) "stimulate policymakers to discuss the effectiveness of the current *tendering legislation* and consider adapted forms of legislation to address unintended side effects".

Another article by Renwick and Gleasure (PS25) discusses about privacy and regulation in the context of blockchain technologies. It reflects the different attitudes towards privacy that generate concerns in the development of blockchain technology. The author suggests effective legislation for regulating information privacy should consider four major factors address concerns related to specific technologies or trends. This paper also highlights the implications of blockchain based systems for regulations. The authors mention how regulators have lagged in regulating alternative finance systems such as cryptocurrencies, due to concerns that regulation may supress innovation and fail to predict actual uses once system is in use. Hence, this article discusses the challenges of regulating privacy attitudes in cryptocurrencies and potential conflicts with other *privacy laws*. It also highlights the difficulty in enforcing regulations and the need for a clear legislative framework to address these issues. The paper discusses the challenges of regulating privacy attitudes in crypto currencies and the potential conflicts with other *privacy laws*. The author also highlights the difficulty in enforcing regulations and the need for a clear legislative framework to address these issues.

Another study by Zhu et al. (PS23) examines the topic of striking the correct balance between safeguarding the incentives for establishing publicly available databases and ensuring enough availability of facts for value-generating actions. The author provides an instructive introduction to the issues and legal evolution of database protection regulation, allowing the author to analyse legal challenges from a financial and administrative standpoint. The authors present a short overview of database laws in the United States and compare it to recent database legislation. The authors suggest that in the future, copyright law may change and play an essential role in database protection. The authors also contrast how the EU implemented the EU database regulation in 1996 in order to consolidate copyright regulations and offer legal guarantee for database contents.

Sub-category 2: Studies on factors that help in shaping the implementation of regulation.

This sub-category focuses on **studies that study the role of institutional and cultural factors or regulatory factors that helps in shaping the implementation of regulation**. This involves studies that investigates how the organizational structures, and the societal contexts influence the adoption, compliance, and effectiveness of regulatory framework. This category includes three studies among primary studies.

The research by Krell and Matook (PS2) presents country-level empirical evidence to find relationship between IS and firm performance. The author mentions how firms need

to abide by a variety of national and international government regulation that have an impact on information system. This study specifically focuses on investments in IS mandated by governmental organizations. "During the data collection period, new auditing regulations were enacted based on the Sarbanes Oxley Act in the US, as a central part of Corporate Law Economic Reform Program Act *(CLERP 9)* in 2004. Since, many firms had to invest in IS to achieve *CLERP 9* compliance, the survey asked participants about IS investment. This survey asked participants 12 months before enactment of *CLERP 9* hence, it provides a unique opportunity to examine a major change in government regulations which provides context for mandatory IS investment in Australia" (Krell and Matook, PS2, p. 9). Robinson & Muurlink (2022) mentions the 2004 *CLERP 9* reforms in Australia were intended to improve standards of auditor independence and enhance auditing practice.

Next, in their study, Hsu et al. (PS3) examine interorganizational information systems (IOS) that speeds up the execution of financial trades between European Investment funds and Taiwanese financial institutions. The objective of the author's is to investigate the adoption and diffusion of Straight Through Processing (STP), which is examined within the context of institutionalized scenarios encompassing regulation, norms, and cognition, as well as how these elements impact implementation of a system from Europe to Taiwan. The authors specifically compare the business environments in Europe and Taiwan within the regulatory context, highlighting the impact of the BASEL II framework in Europe, which imposes stronger regulatory requirements for operational risk reduction. In contrast, Taiwan has less strict BASEL II compliance regulations. The authors suggest that a stronger local regulatory regime, coupled with industry self-regulatory associations, would be the initial strategy for the adoption and diffusion of cross-cultural IOS systems in Taiwan. The article also discusses the potential influence of messaging standards on cross-cultural STP adoption, "as revealed through interviews with bank managers and members from the supervisory bureau. The authors emphasize the role of SWIFT in providing a tactical solution by utilizing existing ISO 15022 messages to facilitate fund order placement Hsu et al. (PS3), p. 12". Overall, the analysis presented in this article underscores the significance of regulation in the decision-making process regarding adoption (Hsu et al., Ps3).

Finally, another article by Threlkel and Kavan (PS33) discusses the shift from traditional EDI/VAN technology to internet-based EDI (Electronic Data Interchange), The authors discuss the positive benefits in expanding the benefits of EDI on broader arena through internet-based systems. However, the companies using traditional EDI are still reluctant in changing to internet-based EDI. One of the major reasons provided by authors is the lack of *internet legislation*, and lack of internet standards, reliability, and security. According to the authors, the *Federal Acquisition Streamlining Act of 1994*, which is a *federal law* that compels the whole US government to officially start adopting electronic commerce (EDI), was accompanied by additional translation layer standards such as EDIFACT and SMTP. Furthermore, authors provide example of regulations. Authors also provides example of regulation such as *The Electronic Financial Efficiency Act of 1997* which was developed to offer a standard framework across the nation for increased electronic authentication that confirms people' identities using digital certificates.

4.4.3 Theme 3: Compliance

This theme focuses on how the needs of stakeholders and users are addressed by incorporating features or functions in IS that promote regulatory objectives. It further elaborates how the research addresses regulatory challenges to provide recommendations and insights to policymakers, organizations, and regulatory bodies that defines the

usefulness of regulations on designing and developing information systems. These studies contribute to understanding the usefulness of regulations in designing and developing information systems.

Table 10 Primary studies belonging to theme compliance.

Theme	Sub-category	Primary Studies
Compliance	By studying compliance with regulatory requirement's while designing or developing a system	PS11, PS18, PS30, PS31
	Integrating regulatory considerations into the design process.	PS4, PS7, PS14, PS22
	Articles about technological advancements discusses how IT artefacts can be used to support government regulation	PS15, PS17, PS19

<u>Sub-category 1</u>: This category studies compliance with regulatory requirement's while designing or developing a system.

Knowledge management, according to Hovav et al. (PS11), is a complicated process that comprises maintaining knowledge within an organization embedded in systems, processes, policies, and individual personnel. The purpose of this study is to investigate the consequences of cyber regulations (CB) and security policies (SP) on the practical application of knowledge management (KM) in firms. Here, cyber regulations are external laws and regulations implemented by external factors and security policies are internal rules or guidelines developed and enforced by organization itself. "SP are mostly driven by standardization organizations such as National institute of Standards and Technology (NIST), or by department of commerce in US or the international standards organization in EUROPE and ASIA or industry consortia such as *Payment Card Industry Data Security Standard (PCI-DSS)*" (Hovav et al., PS11, p.4).

Similarly, Hovav et al. (PS11) address how cyber regulations define what knowledge needs to be protected, how it must be secured, how long it must be guarded, and the consequences for disobedient behaviour. These cyber security regulations are primarily concerned with the infrastructure required to handle raw data as well as fundamental information. The author uses the Health Insurance Portability and Accountability Act (HIPAA) of the United States as an example of the first recognized regulation addressing information privacy. HIPAA covers medical records and patient privacy across the health care ecosystem. Similarly, another Act, the Financial Services Modernization Act (FISMA), often known as the Gramm-Leach-Bliley GLB Act, introduced financial information rules. Similar regulations, known as BASEL agreements, now exist in other affluent nations. Furthermore, some privacy regulations, such as GDPR, are not confined to a single industry. The interaction between privacy rules and security policies, on the other hand, has been utilized to offer context in this study by Hovav et al. (PS11). This setting has been used to develop a model that investigates the direct impact of Knowledge Management (KM) components on organizational results.

Another work by Kwon and Johnson (PS18) discusses how security data protection and regulatory compliance lead to two security outcomes in complex medical circumstances:

information privacy and compliance with regulations. This paper highlights the importance of Electronic Health records (EHRs) in improving health care quality by reducing costs. This paper presents *HITECH Act* as an example to demonstrate how it provided incentives for healthcare providers to implement EHR but with more records being stored digitally, the security of patient data has become a significant concern because fear of data breach is high. As a result, the department of Health and Human Services (HHS) in US put forward a new breach disclosure policy that mandates healthcare businesses to make breach notifications public whenever data losses harm 500 or more people.

The author mentions the demand on healthcare providers to safeguard patient data and comply with rules has significantly grown because of the new regulatory obligations and public concern. Even if actual data security and compliance seem to go together, this link brings up a strange cause and effect dilemma: which one drives the other? Regardless of the incentive, both are crucial since breaches and noncompliance both result in serious reputational harm, costly repair, or fines. Therefore, businesses need to spend money on compliance and security. The authors utilise qualitative research method to analyse the effects of security resources on data breaches and perceived compliance. The major findings demonstrates that the impact of security resources varies depending on result and the organizations security operational maturity. Other studies cited by authors found that in operationally mature organizations, breach occurrences hinder compliance in operationally developed firms, but strangely, compliance has little impact on actual security. In simple words, this indicates that while a breach might have a detrimental effect on and organizational ability to comply with rules, compliance does not always result in an increase in the security of the organization. However, breaches do not hinder compliance in operationally immature organizations, here compliance enhances actual security. This means that compliance is more effective at enhancing security in less mature businesses than it is in matured ones. In conclusion, with new regulatory demands and concerns from the public, raising the burden on medical professionals to adhere to regulations and engage in both security and compliance, this article emphasizes the necessity of safeguarding patient data in the digital era.

Jenkins et al. (PS30) explore the potential penalties that companies may face as a result of compliance with regulations and laws. These implications may include hefty fines or government punishments. For example, in 2019, the Securities and Exchange Commission investigated Siemens, GE, and Philips in China for breaching the *Foreign Corrupt Practices Act*. This article focuses on the difficulty of maintaining regulatory and legal compliance in companies, as well as the possible implications of noncompliance, such as penalties, reputational harm, and economic loss for major corporations with a global workforce. The authors suggest a solution to this problem.

Kim et al. (PS31) explains the creation and deployment of standards to communicate data that will be expressed in ontologies and accessible to automated and efficient machine processing in another work. The author employs TOVE ISO 9000 Micro-Theory to assess the quality management business processes and practices of ISO 9000-compliant organizations. ISO 9000 is a standard that various sectors must follow to be compliant with commerce. Similarly, firms must follow the Sarbanes Oxley Act of 2002, that establishes regulations for public companies' financial accounting. They are, nonetheless, comparable regarding of internal control needs since the ISO 9000 framework may easily offer auditing tools and techniques for SOX.

Sub-category 2: This sub-category includes those studies which integrates regulatory considerations into the design process.

This paper by Oetzel and Spiekermann (PS4) discusses the challenges faced by companies that develop and operate IT applications handling consumer and employee personal data. The primary challenge for such businesses is to safeguard this data and prevent privacy violations. Failure to address this problem might have a negative influence on the company's earnings and reputation, as well as customers and staff. To address this issue, Oetzel and Spiekermann (PS4) propose an approach that use a step-by-step privacy impact assessment (PIA) to methodically consider privacy concerns. The authors contend that existing PIA approaches are disorganized, ambiguous, and time-consuming to implement. As a result, the authors present a technique to help businesses attain the idea of "privacy-by-design," which is often lauded by data protection authorities. To examine the complicated nature of defining privacy and the requirement to define what has to be safeguarded in order to undertake a privacy analysis, the writers provide principles of privacy along with data protection rules. Solove (2002), who conceptualizes privacy along various dimensions, is cited by the author. The author offers a case in this section for one of the most often utilized privacy assessment techniques in most nations, which is a legal compliance check. This idea is supported by Oetzel and Spiekermann (PS4), who cite Raab and Wright (2012). In addition, the authors evaluated the parallels and differences between data protection regulations and privacy rules by merging Solove's list of privacy risks with the data protection legislation to see if the data protection regulation addresses all known privacy concerns. According to the author's conclusions, if *data protection legislation* is followed seriously, with strong data quality and security requirements, all privacy issues outlined by Solove will be handled.

The authors establish a foundation for the claim and argue that the PIA approach they describe is a privacy impact assessment, not just a data protection evaluation prompted by a compliance need. As a result, the authors give a step-by-step complete and exhaustive method of doing a PIA in this article. The authors use the phrase 'privacy targets' rather than 'privacy principles' to focus on actual objects of study (system features) and to assist engineers in identifying design goals. These privacy goals are taken directly from the established privacy principles outlined in the EU Data Protection Directive and the EU's current proposal for additional data protection regulations. They are derived from legislation for European organizations to guarantee compliance with data protection regulations by running through all privacy goals. As a result, these regulations provide a more legitimate and stable long-term basis for system development than privacy objectives derived from a stakeholder approach. The key contribution of this work is the development of a new set of artifacts to help scholars as well as practitioners understand and assess privacy risks while also having a complete awareness of the applicable privacy legal landscape.

The article by Hui et al. (PS7) presents significant findings regarding whether international legislation helps in the fight against cybercrime, which has been a major concern for the criminal justice system. "The *Convention on Cybercrime (COC)*, created by the council of Europe, is the first international legislation to address illegal activities online" (Hui et al., PS7, p. 4). Since it utilizes a broad definition of cybercrime, it includes nearly any harmful internet activity, including DDoS attacks. COC mandates that nations that participate create legislative and other protections against cybercrime. As a result, "the signatory countries had to bring their domestic laws into accord with *COC's* panel and requirements" (Hui et al., 2017, p. 10). In the article, the authors cite Li (2007) to provide an example of Finnish, Swedish and Japanese government to modify their *domestic laws* to address *COC's* provision requirements which creates context for the

study. Hence, the authors try to identify answer if *COC* helps deter cybercrime through this research.

Another article by Henningson and Henriksen (PS14) discusses limited knowledge about how information infrastructure (II) is constructed and the way they may be modified to serve needs. In this paper, the major focus is on European e-customs infrastructure, how companies apply the use of IT artefact to regulate the functioning of the infrastructure's operation, and how users understand these artefacts uniquely. The authors define Information Infrastructures as the systems and technologies linked together which enables the exchange of information through institutions and organizations. These can include any software, hardware or any other digital tools that enable individuals to engage with the Information Infrastructure. Similarly, they bring out the idea of inscription which refers to the ways in which IT artefacts are designed to regulate the behaviour with information infrastructure.

In this paper by Henningson and Henrikson (PS14), the author utilises the *legislation* introduced in EU in general to explain the undergoing significant modification for the infrastructure of European e-customs from paper-based to electronic operations. This transformation aims to increase trade security through greater management of traded products, more accurate trade data and the ability of systems to autonomously filter data in case of any abnormalities. This change is also expected to decrease the administrative burden on traders who now invest an extensive amount of both resources and time in complying with *customs regulations*. As the paper-based infrastructures existed in 1980s needed businesses to deal with more than 200 distinct forms. Hence, the single administrative document (SAD) and *related regulations* were first adopted in EU in 1988 in response to the need to lessen the administrative burden. The authors explain how European e-customs information infrastructure's electronic operations are deeply ingrained in several levels of law, which has an influence on how IT artifacts may be generated and incorporated into information infrastructure. Examples of *Customs laws* which extend to European traders may be found in international treaties, EU legislation, and *state law*, which are organized in a hierarchical system with the latter aiming to support the former. It means *national laws* must conform to *EU laws*, which again must conform international treaties. Similarly, at the regional level, utilising communications, decisions, and regulations European Union acts through the European Commission which conveys the norms through which e-customs should comply with. The authors give an example of Information system called New Computerized Transit Systems (NCTS) which was launched in 200. It is a system that lets goods and materials to pass through one or more nations on their destination without having to pay local taxes or comply with local laws. This was possible for NCTS to comply with existing process inscribed in current TIR (Transport Internationaux routiers) convention. The primary aspect it was possible was because TIR convention is linked with *transit goods regulations* and other legislative bodies are interconnected with customs systems.

Another article by Tsatsou et al. (PS22) provides the context of small and medium-sized businesses (SMEs) in the European Union implementing e-business in a digital business ecosystem. The study focuses on the significance of trust and regulation. As the authors mention, trust and regulations are essential for the growth of digital commerce among EU entrepreneurs. The study evaluates the interaction between trust-based and regulatory concerns that must be resolved before SMEs may conduct e-business in a DBE setting. The study offers a taxonomy that solves important regulatory concerns and promotes trust as a solution to these problems. The authors define taxonomy as a way of clarifying the complicated web of regulations, standards, norms, and removing regulatory overlap and conflict. The researchers used a survey of regulatory difficulties in the first phase of DBE

projects in this qualitative study. The authors cited Berkey (2002) in this article because they were interested in regulatory issue categories. Berkey (2002) identified three types of foreign regulatory difficulties with e-business. These categories are seen as the foundation for building a more extensive research and analysis of regulatory issues that are highly relevant to sector-specific and local implementation of trust relationships in DBE. These regulatory building blocks are intended to serve as the foundation for future research that will result in a self-sustaining regulatory framework for digital ecosystems. The three blocks of regulatory issues suggested by Berkey (2002) are: 1. Using digital signatures, encryption and authentication technology raises legal and regulatory difficulties. 2. *Laws and regulations safeguard intellectual property rights, including patents, trademarks, and copyrights*. 3. Legal and regulatory issues relating to consumer protection, such as privacy, security, and dispute resolution. In this instance, the taxonomy categorizes *regulatory* concerns relevant to DBE, establish limits and identifies significant regulatory aspects. It serves as a baseline of knowledge and an initial point for comparison for regulatory and administrative action. This taxonomy can also raise attention and serve as a basis for the development of an understanding on regulatory issues that will benefit all parties concerned.

Sub-category 3: This category involves studies about technological advancements that discusses how IT artefacts can be used to support government regulation.

Article by Gozman and Currie (PS17) empirically investigates the role of investment management system (IMS) in regulatory compliance mostly after financial crisis of 2008 taking into focus of both regulatory and automated rules from the financial sector of EU and US within IMS. The paper examines how new systems can help comply with regulatory requirements imposed by *Market Abuse Directive (MAD II)*, *Markets in Financial Instrument Directive (MIFID II)*, EU directives which were introduced after financial crisis. These regulations have been used as a motivation for research as they aim to study the role of investment management system in helping firms comply with regulations Gozman and Currie (PS17) P. 8. This paper highlights the role of information system in achieving regulatory compliance through security strategies such as risk assessment, data encryption, access control and security monitoring. The authors argue that information system can help organizations address the complex regulatory landscape by providing tools and techniques to manage data security and privacy risk.

Drummer et al. (PS15)'s empirical study on the effect of ICT on the financialization of credit provides a similar context. The research looks at how ICT has transformed, enabled new forms of credit and financialization, and how it has changed the way credit is produced, distributed, and consumed. The cross-disciplinary approach utilised by author across finance, economics and information system research provides context about banking regulation related to financial industry. The core focus of the authors is on how regulation will be essential in the next years in directing the expansion of marketplace lending in a beneficial manner. With this fresh trend of financialization led by ICT, the authors suggest governmental organizations, regulatory authorities, and decision-makers to investigate new regulatory measures, and multinational standards backed by stronger legislation and regulations.

Another article by Iannacci (PS19) focuses on the investigating the transformation in legislative and IT artefacts which are implicated in the transformation of police-prosecutor routines through a case study of crown prosecutor's work. It disentangles the haphazard connection among legislative and IT artifacts and charts the recurrent cycle of legislation-induced shifts in technology and technologically driven changes in legislation across time. The paper investigates the statutory charging scheme, an administrative rule

that has lately changed police-prosecutor relations in the English criminal justice system. It is linked to the *Criminal Justice Act of 2003*. The paper explores how the criminal justice act's statutory charging structure has lately modified police-prosecutor relations, as well as what legislative and IT artifacts are involved in this transition. Since the CJA and the Statutory Charging Scheme have been identified as legislative artifacts that have a constitutive function in establishing novel structures and social standards in the English criminal justice system. They have been viewed as legislative artifacts that have a formal status in an internal and required relationship. Similarly, IT artifacts that perform a regulatory purpose are examined.

4.4.4 Theme 4: Policies

In a variety of contexts, policy is a collection of guiding principles that directs choices in the direction of desired results Culnan (2019). This phenomenon of the research details out the studies in information system which talks about the policy-relevant insights for effective implementation of regulatory frameworks. There is only one qualitative research article under this theme (see Table 9).

Table 11 Primary studies which belongs to theme Policy.

Theme	Sub-category	Primary Studies
Policy	Policy makers or regulators need to stay informed about developments in online environments	PS6

The authors Kim et al. (PS6) discusses the concept of prosocial-rule breaking behaviour (PSRB) and their relationship with information security policies. The authors in this study look at whether healthcare employees knowingly violate information security laws to help their patients. Here, the authors utilise *Health Insurance Portability and Accountability Act (HIPAA)* to demonstrate there are regulations protecting patient health information in the United States to preserve an individual's medical record and health information. Similarly, South Korea enacted the Personal Information Protection Act (PIPA) in 2011 to provide context for PSRB and to clarify in more depth of violations in medical data security. PIPA serves as the structure of the research as a theoretical model and includes the elements affecting student nurses' willingness to share information about patient health. This concept was empirically evaluated with student nurses in South Korea via a survey.

4.5 Which Policy Cycle Phases does empirical IS studies belong to?

The phases of policy cycle present a chronological framework that makes it easier for policy makers and stakeholders to pass through the process of policy making. This section presents stage-by-stage evaluation of primary studies to understand the phase of policy cycle. Hence, we follow Anderson (2014)'s framework in guiding the examination of policy process who defines five stages model of public policy. This clarification provides evidence of the primary studies that belong in each policy cycle stages.

Problem Identification phase: None of the primary studies belonged to this category.

Formulation: According to the handbook of public policy analysis Jann and Wegrich (2007), this stage defines the objectives and what should be accomplished with the policy.

The study by Oetzel and Spiekermann (PS4) proposes a new methodology to access privacy impact assessment by following the principle of "privacy-by-design" which utilises privacy principles and *data protection regulations* through which privacy threats can be addressed. It includes regulatory considerations into designing a new privacy impact assessment. Hence, this paper proposes a methodology that considers privacy issues to reduce the complexity of privacy regulation, it belongs to the formulation stage. This primary study falls under the theme of compliance.

Similarly, Zhu et al. (PS23) add to the knowledge of the continuing database protection discussion by offering an educational introduction to the concerns and legal evolution of database protection. The author focuses on novel database restrictions that affect all players in the information economy, with database developers, data users, and creator consumers being significant aspects to consider in policy development in financial interests. As a result, it emphasizes the divergent approaches of the EU and the US in developing data reuse laws and emphasizes the significance of establishing a socially beneficial data reuse policy that can be harmonized across jurisdictions globally. As a result, it falls under the policy cycle's formulation stage.

Adoption: This phase attempts to answer the issue regarding how policy is developed or implemented to address a problem. This category is comprised of five studies.

The primary study by Kim et al. (PS6) studies Pro social rule breaking behaviour to understand and establish standards to protect patient's medical record from security breaches. This falls on the adoption cycle because the PSRB occurs when an individual intentionally violates a health information security regulation or policy for wellbeing of stakeholders. In this primary study, policy alternative such as (Health Insurance Portability and Accountability Act) HIPAA in US and Personal Information Protection Act (PIPA) in South Korea are provided as an example.

Another study by Henningsson and Henriksen (PS14) talks about e-customs as well as states regulations that include national legislation, EU law, and goods in transit regulation in the context of European e-customs, which illustrates how behaviour inscription and flexible understanding take place in information infrastructure. In this main research, the researchers investigate how different stakeholders, such as customs officials, dealers, and software developers, understand and implement the legislation using an e-customs system.

The following research by Iannacci (PS19) investigates the changes inherent in legislation and IT artifacts that are implicated in the change of police-prosecutor rituals via a case study of crown prosecutor's job. The paper explores how the criminal justice act's statutory charging structure has lately modified police-prosecutor relations, and how legislative and IT artifacts are involved in this transition.

Next study by Steinhauser et al. (PS20) discusses the role of *telemedicine regulation, general data security legislation, general liability legislation* on the adoption likelihood of different telemedicine applications such as remote consultations, remote monitoring. The regulation in this study talks about studying the factors that influence the adaptation of telemedicine application by healthcare organizations in Europe.

Tsatsou et al.'s (PS22) last paper in this category analyses EU directives and Contract Law throughout the lens of small and medium-sized firms employing e-business in the EU's digital business ecosystem. In this setting, the article emphasizes the necessity of regulation and trust, and it proposes a framework taxonomy to handle fundamental

regulatory challenges. This taxonomy is seen as a means of simplifying laws, rules, and norms.

Implementation: This phase of policy cycle puts the policy into practice. There are 22 articles that falls under this stage of policy cycle.

An article by Cooper et al. (PS1) research on *HFT regulations, The Securities Act*, market efficiency, and the influence on long-term investors' expenses. It studies about its effect. Through this article, authors suggest regulations to be kept simple, keeping participants behaviour stable and make the interactions transparent to facilitate the best outcomes and keep investors away from conflicts.

Krell and Matook's (PS2) article analyses how the dominance of regulatory pressure as an investment motive influences competitive advantage. As some businesses mix obligatory investments with substantial long-term planned IS investments, the controlling role of mandatory investment varies. If government laws such as *SOX, other auditing regulations, and other money-laundering legislations* constitute a dominating investment motivation, the authors claim that IS investments involve a substantial required component. As a result, such investments are heavily influenced by externally determined timing and technical standards, making it more difficult to deploy investments for strategic purposes. As a result, this study investigates how government regulation influences competitive advantage in information system investments.

Hsu et al. (PS3) examine the regulative pillar and coercive isomorphism, which gives the idea of rules and regulations via the power of compliance and the authority to apply punishments for both Taiwan and Europe's institutional settings. Thus, the author's empirical analysis indicates the enactment of a cross-cultural inter-organizational information system (IOS) that includes the recognition, interpretation, and management of regulative, normative, and cognitive pillars. Regulatory pillars are rules and regulations that serve as the foundation for coercive isomorphism to manage organizational behaviour.

Next article by Hui et al. (PS7) discusses about *convention on cybercrime (COC)* and the domestic laws of signatory countries that must be brought into account with *COC's* procedural requirements to enforce it. For example, "the *Finnish legislature* had to add new provisions concerning information processing systems and possession of instruments used for cybercrime and establish the corresponding liability. Similarly, Sweden government had to harmonise laws regarding punishment of forgery, child pornography, unlawful use of computers and monitoring of computer information including violation of copyright and related right. Similarly, Japanese government also made changes to its laws to address the COC's data retention and provision requirements." (Hui et al. (PS7) Page: 10)

Article by Chan et al. (PS8) discusses about the regulation of Communications and Decency Act (CDA) in discussion related to online platforms and their liability for user-generated contexts including the content of online prostitution. Since, this phase aims to highlight the importance of proper technological design and policy change to address the vulnerability. The author utilises data from Craigslist adult section and police reports to analyse the effect of the website on market for prostitution.

De Vaujany et al. (PS9) examines the possibilities of IT-based regulation and how it enables novel relationships and regulatory procedures. The writers make use of a variety of IT-based regulations that firms utilize to oversee and manage their work practices. The

article uses the Dodd-Frank Act as an example of a complicated IT-based regulatory system for equities trading and accounting standards in the financial services sector that significantly transformed regulatory practices. This makes IT extremely adaptable and strong in terms of regulatory capacities.

Next article by Kwon and Johnson (PS10) discusses about regulations such as HIPAA, HITECH, Breach notification law to explain about how these apply to adopted policies. Regulations such as HIPAA addresses the interchange of information between organizations by mandating that organizations comply with privacy and security standards. Thus, regulatory pressure is relevant at both the individual organization level and for groups of organization.

Next article by Hovav et al. (PS11) examines how cyber regulations and security policies influences knowledge management practices within organizations, and how these practices subsequently impact organizational outcomes. The major attention is on the *cyber regulation* carry into effect or apply adopted policy. Since security policies are implemented to comply with other governmental laws such as *SOX, GDPR, GLB.*

Currie et al. (PS12) has an empirical focus of the article on the dialectic tensions in the financial market related to regulatory technology, utilising longitudinal case study of pre- and post-crisis period. The authors utilise regulations such as *financial regulations, SOX, Securities Exchange Act* in the context of their impact on financial markets and the use of technology to comply with regulation.

Next study by Currie and Seddon (PS13) discusses the regulatory, technological and market aspects of HFT, and highlights the further need for research in this area. The author utilises regulations such as HFT regulation, financial regulation, MIFID II, HFT Act, MIFIR to provide a context of HFT and its impacts on various regulations, directives, and laws on financial markets.

Another study by Drummer et al. (PS15) discusses the banking industry; the authors state that regulation and legislation are frequently seen as facilitators for financialization in recent years and that deregulation has led to the expansion of computerized stock trading, such as how the growth of high-frequency trading had a system intended to promote efficient price formation in exchanges, and how it increased trading volumes and reduced latency through ICT. The essay analyses how these restrictions have affected the financialization of credit and the role of information and communication technology in pushing this trend.

Another article by Jiang et al. (PS16) discusses the factors that influence investor platform choice, including herding behaviour, platform attributes and regulations. The authors discuss about governmental regulations, *JOBS Act.*

Next article by Gozmann and Currie (PS17) has its empirical focus to investigate the role of investment management system (IMS) in regulatory compliance, mostly in the era of post financial crisis. The paper examines how this system can help firms comply with regulatory requirements imposed by *MAD II, MIFID II, EU Directives*, which were introduced to the financial crisis of 2008.

On next article by Kwon and Johnson (PS18), the author examines *HIPAA, HITECH, state security laws, and security legislations* in relation to the context of health care security procedures for protecting information and compliance with regulations. The article discusses how healthcare organizations can comply with these regulations and

ensure the security and privacy of patient data. This article focuses on investigating security strategies used in healthcare organizations for data protection and regulatory environment.

Another article by Watson et al. (PS24) provides analysis through national differences that influences the effectiveness of constraints. The authors mention several approaches to *civil law* and *socialist law*. Similarly, *common law* is the prime basis of law in US. Furthermore, the laws have been presented as having varying degree based on religion under the *social law*. Here, author presents *Islamic law* in Saudi Arabia. Hence, the paper analyses how changing in patent policy can affect market power and innovation incentives.

The following study (PS28) by Khan and Lacity investigates how firms react to anti-offshoring challenges regarding information technology as well as processes. The research investigates the elements that determine how responsive an organization is to anti-offshore institutional forces, including the features associated with these pressures and the organization's past offshoring success. The author addresses anti-offshoring laws and questions whether such institutional anti-offshoring measures are acceptable, essential, or successful.

Sen and Borle (PS29) explore the likelihood of data breach occurrences in the lens of the company's actual location, principal location, and kind of data breach that has previously happened. The laws such as *FISMA, Data breach notification laws, Privacy Act* indicate that despite preventive measures taken by organizations data breach incidents continue to happen in US. These law measures their potential impact on reducing the risk of data breaches.

Jenkins et al. (PS30) is concerned with organizational regulation and legal compliance. It investigates how businesses might evaluate violation by tracking user responses and cursor motions in an online survey. The writers discuss the FCPA and anti-money laundering laws in relation to individuals' compliance with legal and regulatory obligations in an organizational environment in this article.

Similarly, Kim et al. (PS31) addresses the creation and use of the *TOVE ISO 9000* Micro-theory, which employs ontologies for qualitative management. The author explains *SOX*, which is used to research compliance with company practices and process regulations.

The following paper (PS32) by Thatcher and Clemons outlines a strategy that insurance firms can employ in these regulatory circumstances to regain customer engagement in the insurance industry and prevent such prejudice amongst the insureds. The findings have important consequences for insurance company policy designs and privacy regulations enacted by industry regulators.

Threlkel and Kavan's final article (PS33) discusses internet legislation, FASA, Electronic Financial Services Efficiency Act (EFSEA) for the novelty of technology for the internet, the potential internet legislation and absence of internet regulations, as well as the dependability of data transfer within the internet environment. As a result, this study investigates management concerns and outlines existing and possible solutions accessible to both new and experienced EDI users.

Evaluation: This phase discusses the benefits, advantages, disadvantages, challenges with target groups to discuss about the how the policy achieved the objective. It consists of four primary studies.

An article by Boonstra and Offenbeek (PS5) examines European tendering legislation that shapes the selection process of software by providing guidelines and requirements for advertising tenders, selecting suppliers, and awarding contracts. These activities help determine what this legislation accomplishes and helps in identifying gaps and if there are any new problems to look for.

Another article by Laffey (PS21) examines *gambling legislation* in US. The author presents a case study analysis of a start-up; PartyGaming in the online gambling industry, and the challenges it faced in its growth along with ethical issues and prospects.

Renwick and Gleasure (PS25) discusses about *privacy regulation* in the context of challenges that regulators face in regulating blockchain based systems. It explores the tensions that arise between different social groups involved in blockchain development, who have different attitudes towards privacy and may have some disagreement upon which privacy capabilities specific blockchain system should have.

The final article in this category, by Monterio and MacDonald (PS27), investigates the evolution of competition in the US aviation sector. The research examines how industry actors used information from the regulatory period to present-day situations and highlights the expanding tactical use of information. The authors assess the setting of the airline deregulation Act, which aided in reducing the stricter regulation.

5.   Discussion

The primary goal of this section is to discuss on the significant developments and trends relevant to in legal regulation within basket of 8 journals in the domain of information systems. This is achieved by summarizing the results of the SLR and highlighting the major topics that primary research has focused on, as well as their key conclusions. This section begins by examining general observations of the SLR, discussing the research techniques utilised by primary studies, exploring common legal regulations, and finally investigating into the theoretical lens that defines the stages of the policy cycle.

The results support Okoli's (2015) claim that utilising a systematic literature review method facilitates synthesizing current state of knowledge, identifying knowledge gaps, and reaching in-depth conclusions about the existing literature on the provided topic. In this thesis, the primary studies were categorised under specific themes. Four possible themes were identified: impact, implementation, compliance, and policy. These themes captured the key ideas and concepts that emerged from the research conducted in the field of information systems. Given the broader nature of each theme, creating sub-categories within them provided a more detailed perspective of themes with granular level of understanding of the topic.

The SLR involved a full-text review of 210 articles on legal regulations in information systems published between 1996 to 2022. These articles were discovered, categorised, and evaluated with 33 selected as primary studies. The examination of these primary studies focused on understanding how legal regulation has been studied, considering factors such as publication year, publication journal, author, research methodology used, policy cycle stage, the industry in which legal regulation is enacted upon and specific legal regulation.

5.1   Discussion on Research Method

Our findings (see Figure 2) regarding the overall primary studies conducted from 1996 to 2022 indicate a relatively low number of studies (less than 2 studies a year) during the initial decade that empirically studied legal regulation. However, in the second half of the second decade from 2006 to 2016, the number of studies more than doubled. Although, there was a decrease in the number of studies during the first half of the second half of this decade shows promising growth. Battista and Uva (2023) suggest that due to rapidly changing regulatory or jurisprudential interventions, regulations need to be amended frequently to address match new technological issues and opportunities.

From a similar perspective, it is important to note that, this thesis focuses exclusively on empirical studies. Therefore, during the initial selection and application of inclusion/exclusion criteria, approximately 140 articles irrelevant to this study, were identified. Among these articles, there were a few studies that utilised artefacts, methodologies, and frameworks to achieve research goals. These studies belong to the field of design-science research, which is not considered empirical. Hence, research methods involving design-science research were excluded. The application of design-science methodology primarily aims to develop knowledge that professionals in the relevant discipline can use to design solutions for future problems, rather than creating alternative options for existing problems (Wikipedia contributors, 2023a). However, the use of qualitative and quantitative methodologies was mostly observed during this thesis.

5.2   Discussion on common legal regulations

This thesis identified common regulations within IS research. While primary studies focused directly on legal regulations, there were other regulations that utilised legal regulation as a motivation or as an example. Among the primary studies, legal regulations from the US such as SOX, HIPAA, HITECH, and HFT regulations, were commonly utilised. Similarly, legal regulations from Europe such as GDPR, MIFID were frequently referenced in multiple studies. In addition to these legal regulations, this thesis also identified other common regulations within IS research, I will discuss about legal regulation within IS research that has explored the **capabilities of cyber security as it is an emerging field within IS**.

In addition to the primary studies by Hovav et al. (PS11) and Hui et. al. (PS7), which focus on and compliance with existing regulations, this section to discusses the trend in information system that has seen plenty of studies on the impact of laws and regulations on cyber security implementation within industries. With the increasing advancements in technology, the cybersecurity field studied within IS domain has gathered significant interest in adhering to latest regulations and laws. Organizations are keen on implementing them, regulators are aiming to design frameworks for the effective use of such legal regulations, and researchers are attempting to identify the impact and access any gaps or challenges in implementing such regulations in real-world scenarios.

Li et. al (2016) presents a case study to demonstrate the usefulness of text-mining based system called AZ Secure in a real-world cyber forensics environment. While the paper's focus is on carding; a fraudulent activity involving theft, reselling, and use of large volumes of payment information that has had a significant impact on economy and society, the author utilises the system based on social media analytics, and sentiment analysis of customer reviews to identify the main sellers of such information. Overall, the system has proven effective in addressing questions such as "who created malware to conduct cyber carding, who sold the stolen card data, and what are the characteristics of top sellers in carding community" (Li et al. 2016, p. 23). The major finding from this case study is that despite strong cyber related regulations being enforced in various forums, sellers remained actively involved in fraudulent activities.

Next article by Yoo et. al (2020) explores how organizations maintain their expected level of cybersecurity by evaluating the effectiveness of information security within their organizational units. This information security effectiveness also known as ISec, aims to understand the achievement of desired effects within workgroups, especially workgroup information security effectiveness. These workgroups deal with cybercrime reports and undergo cybersecurity awareness trainings. However, ISec is governed by its own regulations and the confidentiality policies of information enforced by the organizations. Hence, this study utilises ten indicators to identify the behaviour of employees to measure the effectiveness of information security within an organization.

Similarly, Aryankalam (2020) investigates the government's cyber security capabilities and the role of the rule of law in a country, examining its relationship with foreign disinformation through social media and social polarization. Among the three contributions of this study, one highlights the critical role of the government in restricting the use of information by hostile foreign groups seeking to disrupt the country through cyber-related crimes. This study empirically demonstrates the significance of government security in determining which foreign information may harm its citizens and society.

In terms of regulations, the primary studies in this study focused on two themes: impact and compliance. However, the field of information systems encompasses more themes that offers diverse research avenues. Exploring how regulations play a vital role in these diverse themes could be an interesting avenue for future observations.

From the primary studies, it is evident that 46% studies, examined legal regulations from the US with highest attention, followed by 20% from Europe. This opens untapped opportunities for other countries such as Asia or Africa which are experiencing technology adoption and require regulatory frameworks in areas like healthcare, data security, cybersecurity, finance and more. Furthermore, while global regulations may share have some similarities at a surface level, it is important to consider factors such as political, cultural, economic, and social as regulations differs between the Asia, Africa, the US, and Europe. This provides a more concise understanding of the impact that legal regulations have on the global landscape. For example, how Finland, Sweden and Japan brought the change in their domestic laws to align with the international conventions on cybercrime to fight against cybercrimes.

5.3   Discussion on Theoretical lens

The theoretical lens of policy cycle stages provided by Anderson (2014) was utilised to view the specific stages that our primary studies fall into. In this thesis, I utilise different stages including problem identification or agenda setting, formulation, adoption or decision making, implementation, and evaluation. It has been observed there are no primary studies that fall under problem identification stage. Jann and Wegrich (2007) describe this stage as the demand for the identification of social problems as well as the expression of the need for state involvement. The next step at this point would be to set an agenda to bring an attention to the identified issues or problems to which government officials give close attention to and try solving such issues with policies. "Although, the government's agenda is a focal point for studies on agenda setting, the means and mechanisms of problem recognition and issue selection are closely linked to how social problems are recognized and perceived in public media" (Jann and Wegrich (2007)). As a result, execution of recognized issues appears more frequently in practice than in research studies. Hence, no studies fall under this stage.

Formulation stage is where objectives for the policy are developed This stage involves engaging the stakeholders, regulators, governments, enactors, experts, affected groups or individuals to define the objectives. Among primary studies, this phase has the lowest number of primary studies (two) belonging to it. For example, Zhu et al. (PS23) brings database creators, data users and consumers, other stakeholders impacted by issues related to database protection which can be applied in both EU and US.

The adoption stage aims to establish and enact policies to address a problem. In this stage, the studies focused on legal regulations and their role in defining policy design and content. For example, Tsatsou et al. (PS22) analyze EU directives and contract law in the context of small and medium-sized firms. The study addresses key regulatory issues by proposing a framework taxonomy which serves as a means of simplifying laws, standards, and norms. Overall, there are 5 primary studies under this stage. Our findings indicate that at this stage, regulations are enacted precisely when the problem is clearly identified. In other cases, legal regulations are utilized in a more general context. For example, Kim et al. (PS6) study PSRB (Pro-social rule breaking behaviour) to establish standards to protect patient's medical record from security breaches. The author discusses about adoption of PIPA in South Korea, based on HIPAA in the US. Although, enacted on different countries, both acts provide protection of the privacy and security of personal

information. HIPAA focuses on healthcare information and PIPA has broader implications for information privacy. On the other hand, Henningsson and Henriksen (PS14) discusses e-customs and mentions regulation such as national legislation, EU law, transit goods regulation in the case study of European e-customs, illustrating how behaviour and flexible interpretation are inscribed in information infrastructure. Since, the identification of problem is not fully clear, in the study by Henningson and Henriksen (PS14), they study legal regulation that addresses common aspects of problems.

The implementation stage involves putting policy into practice. 22 primary studies fall under this stage. This phase primarily discusses the impact of policy implementation into action. These outcomes are recorded as evaluations of implementation strategy, finding cases of successful implementation and thorough understanding of general impact of legal regulations. For example, Hui et al. (PS7) discusses about *convention on cybercrime (COC)* and the domestic laws of signatory countries that must be brought into account with *COC's* procedural requirements to enforce it. It is an international treaty that addresses cybercrime by harmonizing national laws of countries that have ratified the treaty. "The authors provide instances on how the lawmakers from Finland had to adopt modifications concerning computer systems for processing information to their domestic laws, and how the administration from Sweden adjusted the penalties for forged information and materials related to juvenile pornographic contents. Similarly, Japan also made changes to its domestic laws to address COC's data retention" (Hui et al., 2017, p. 10).

Evaluation phase discusses the challenges, benefits, advantages of how the objectives were achieved through policies. Renwick and Gleasure (PS25) discusses *privacy regulation* in the context of challenges that regulators face in regulating blockchain-based systems. The study explores the tensions that arise between different social groups involved in blockchain development, who hold different attitudes towards privacy and may have disagreement about specific privacy capabilities that a specific blockchain system should have.

Hence, the use of policy cycle helped in examining legal regulations that utilises systematic approach to identification of problems in a society, the enactment of policies, their impact, challenges, and an opportunity to involve government officials, and publics in solving the problems that have a societal impact.

6. Conclusion

This section provides an overview of the conclusion for this study, discusses the limitations of the study, and suggests possibilities of future research.

This thesis presents a systematic literature review, on how the empirical studies in information systems research have addressed the topic of legal regulation. The study thesis utilised basket of 8 journals to answer the research question: *"How has empirical IS research studied the legal regulation."* Furthermore, it answers the research question by exploring the research methods utilized by the selected studies, the specific regulations mentioned in this field and by identifying policy cycle phases of study that come under the five-stage policy cycle that follows theoretical lens offered by Anderson (2014). This study was achieved by conducting a SLR approach provided by Okoli (2015). This approach was used to analyse 210 papers. Based on inclusion/exclusion criteria, 33 primary studies were selected from 1996 to 2022. Among 33 studies, 31 studies followed qualitative methodology and 2 studies followed quantitative methodology.

The analysis of the primary studies revealed that the Journal of IT accounted for 33.33% of total studies, followed by the Journal of Management Information Systems with 24.24%. These two online journals were the most frequently used platforms to publish articles that empirically studied legal regulation. Among 33 primary studies, 46% of legal regulations from US, indicating the highest attention given to this jurisdiction. Four primary studies, PS2, PS11, PS12, PS31 studies examined *Sarbanes Oxley Ac*t, while four studies PS3, PS6, PS10, PS18 study *Health Insurance Portability and Accountability Act* and two studies PS1, PS13 study about *High Frequency Trading regulation*. Europe accounted for 20% of studies with three primary studies PS11, PS15, PS25 examining *General Data Protection Regulation* and three studies PS12, PS15, PS17 focusing on the *Markets in Financial Instruments Directive.*

This thesis also categorises the primary studies based on theoretical lenses. Among the five policy cycle stages, 72% of the articles (22 primary studies) fell under the implementation phase which explores the policies that have been put into practice. However, the initial stage of the policy cycle – problem identification or agenda-setting stage had no studies under the category.

6.1 Limitations of the study

Irrespective of the search strategy utilised for both the SCOPUS and AIS Library, this SLR only aimed to include the studies from SCOPUS review, which limited the overall scope of the findings. Additionally, as already mentioned in the inclusion, exclusion criteria only the research studies published in English language have been chosen for this study which defines language bias. Furthermore, this thesis focused solely on empirical information systems research, excluding other types of research such as theoretical frameworks, models, or conceptual discussions. Incorporating conceptual studies could have provided a clearer understanding of the domain and generated a more comprehensive review of the literature within information systems research. Additionally, this SLR only focused on the journals from basket of 8 information systems journals but did not include other journals. These limits the findings generalizability.

6.2   Future research prospects

Possibilities for future research could extend this investigation to include a wider range of IS journals except basket of 8 journals and conferences, beyond the selected basket of eight journals. Additionally, while most primary studies utilised qualitative research methods, with only 2 studies that utilized quantitative methods. This suggests the potential for future IS research on legal regulation that incorporates other methodologies such as, mixed-method, or design science methodology.

7.   References

Anderson, J. E. (2014). *Public Policymaking: An Introduction* (8th ed.). Cengage Learning. (pp. 1-36)

Battista, D., & Uva, G. (2023). Exploring the Legal Regulation of social media in Europe: A Review of Dynamics and Challenges—Current Trends and Future Developments. Sustainability, 15(5), 4144. https://doi.org/10.3390/su15054144

Braman, S. (2003). *Communication Researchers and Policymaking*. In The MIT Press eBooks (Illustrated). MIT Press. https://doi.org/10.7551/mitpress/1949.001.0001

Bridgman, P., & Davis, G. (2003). What Use is a Policy Cycle? Plenty, if the Aim is Clear. Australian Journal of Public Administration, 62(3), 98–102.

Geoffrey, R. (2005, October 21). Crimes Against Humanity. *The New Press*. https://thenewpress.com/books/crimes-against-humanity

Merriam-Webster. (2023). Law. In Merriam-Webster.com dictionary. Retrieved June 16, 2023, from https://www.merriam-webster.com/dictionary/law.

Jann, W., & Wegrich, K. (2017). Theories of the policy cycle. In Handbook of public policy analysis (pp. 69-88). Routledge.

Lasswell, H. D. (1951). *The Policy Orientation*. In D. Lerner, & H.D. Lasswell (Eds.), The Policy Sciences: Recent Developments in Scope and Method (pp. 3-15). Stanford, CA: Stanford University Press.

Legislation. (2023). In Cambridge Dictionary. Retrieved June 16, 2023, from https://dictionary.cambridge.org/dictionary/english/legislation

Li, X. (2007). International Actions against Cybercrime: Networking Legal Systems inthe Networked Crime Scene. ResearchGate.

Okoli, C. (2015). A guide to conducting a standalone systematic literature review. *Communications of the Association for Information Systems*, *37*.

Policy, law – decision-making process | European Union. (n.d.). European Union. Retrieved June 16, 2023, from https://european-union.europa.eu/institutions-law-budget/law/how-eu-policy-decided_en

Robinson, P. N., & Muurlink, O. (2022). Impact of CLERP 9 Reforms: A Longitudinal Analysis. Australian Accounting Review. https://doi.org/10.1111/auar.12365

Regulation definition and meaning | Collins English Dictionary. (2023). In Collins Dictionaries. Retrieved June 16, 2023, from https://www.collinsdictionary.com/dictionary/english/regulation

Types of legislation | European Union. (n.d.). European Union. Retrieved June 16, 2023, from https://european-union.europa.eu/institutions-law-budget/law/types-legislation_en

U.S. Senate: Laws and Acts. (2019, May 31). United States Senate. Retrieved June 16, 2023,   from

https://www.senate.gov/pagelayout/legislative/one_item_and_teasers/Laws_and_Acts_page.htm

Bouchrika, I. (2023, May 12). What Is Empirical Research? Definition, Types & Samples. Research.com. Retrieved June 16, 2023, from https://research.com/research/what-is-empirical-research

Wikipedia contributors. (2023a). Civil law (legal system). Retrieved June 16, 2023, from Wikipedia. https://en.wikipedia.org/wiki/Civil_law_(legal_system)

Wikipedia contributors. (2023b). Public policy of the United States. Retrieved June 16, 2023, from Wikipedia. https://en.wikipedia.org/wiki/Public_policy_of_the_United_States#:~:text=The%20policies%20of%20the%20United,executive%20decisions%2C%20and%20legal%20precedents.

Wikipedia contributors. (2023c). Design science (methodology). Retrieved June 16 Wikipedia. https://en.wikipedia.org/wiki/Design_science_(methodology)

Yoo, C. W., Goo, J., & Rao, H. R. (2020). Is cybersecurity a team sport? A multilevel examination of workgroup information security effectiveness. *Mis Quarterly*, 44(2).

Appendix A – Comprehensive reference list of primary Studies

PS1. Cooper, R., Seddon, J., & Van Vliet, B. (2017). High-frequency trading and conflict in the financial markets. Journal of Information Technology, 32(3), 270-282.

PS2. Krell, K., & Matook, S. (2009). Competitive advantage from mandatory investments: An empirical study of Australian firms. The Journal of Strategic Information Systems, 18(1), 31-45.

PS3. Hsu, C., Lin, Y. T., & Wang, T. (2015). A legitimacy challenge of a cross-cultural interorganizational information system. European Journal of Information Systems, 24, 278-294.

PS4. Oetzel, M. C., & Spiekermann, S. (2014). A systematic methodology for privacy impact assessments: a design science approach. European Journal of Information Systems, 23, 126-150.

PS5. Boonstra, A., & Van Offenbeek, M. A. (2018). Shaping a buyer's software selection process through tendering legislation. Information Systems Journal, 28(5), 905-928.

PS6. Kim, J., Park, E. H., Park, Y. S., Chun, K. H., & Wiles, L. L. (2022). Prosocial rule breaking on health information security at healthcare organizations in South Korea. Information Systems Journal, 32(1), 164-191.

PS7. Hui, K. L., Kim, S. H., & Wang, Q. H. (2017). Cybercrime Deterrence and International Legislation. Mis Quarterly, 41(2), 497-524.

PS8. Chan, J., Mojumder, P., & Ghose, A. (2019). The digital Sin City: An empirical study of Craigslist's impact on prostitution trends. Information Systems Research, 30(1), 219-238.

PS9. De Vaujany, F. X., Fomin, V. V., Haefliger, S., & Lyytinen, K. (2018). Rules, practices, and information technology: A trifecta of organizational regulation. Information Systems Research, 29(3), 755-773.

PS10. Kwon, J., & Johnson, M. E. (2014). Proactive versus reactive security investments in the healthcare sector. Mis Quarterly, 38(2), 451-A3.

PS11. Hovav, A., Gnizy, I., & Han, J. (2023). The effects of cyber regulations and security policies on organizational outcomes: a knowledge management perspective. European Journal of Information Systems, 32(2), 154-172

PS12. Currie, W. L., Gozman, D. P., & Seddon, J. J. (2018). Dialectic tensions in the financial markets: A longitudinal study of pre-and post-crisis regulatory technology. Journal of Information Technology, 33(4), 304-325.

PS13. Currie, W. L., & Seddon, J. J. (2017). The regulatory, technology and market 'dark arts trilogy' of high frequency trading: a research agenda. Journal of information technology, 32(2), 111-126.

PS14. Henningsson, S., & Henriksen, H. Z. (2011). Inscription of behavior and flexible interpretation in Information Infrastructures: The case of European e-Customs. The Journal of Strategic Information Systems, 20(4), 355-372.

PS15. Drummer, D., Feuerriegel, S., & Neumann, D. (2017). Crossing the Next Frontier: The Role of ICT in Driving the Financialization of Credit. Journal of Information Technology, 32(3), 218–233.

PS16. Jiang, Y., Ho, Y. C., Yan, X., & Tan, Y. (2018). Investor platform choice: Herding, platform attributes, and regulations. Journal of Management Information Systems, 35(1), 86-116.

PS17. Gozman, D., & Currie, W. (2014). The role of investment management systems in regulatory compliance: A post-financial crisis study of displacement mechanisms. Journal of Information Technology, 29(1), 44-58.

PS18. Kwon, J., & Johnson, M. E. (2013). Health-care security strategies for data protection and regulatory compliance. Journal of Management Information Systems, 30(2), 41-66.

PS19. lannacci, F. (2014). Routines, artefacts, and technological change: investigating the transformation of criminal justice in England and Wales. Journal of Information Technology, 29(4), 294-311.

PS20. Steinhauser, S., Doblinger, C., & Hüsig, S. (2020). The relative role of digital complementary assets and regulation in discontinuous telemedicine innovation in european hospitals. Journal of management information systems, 37(4), 1155-1183.

PS21. Laffey, D. (2007). The ultimate bluff: a case study of partygaming.com. Journal of Information Technology, 22(4), 479-488.

PS22. Tsatsou, P., Elaluf-Calderwood, S., & Liebenau, J. (2010). Towards a taxonomy for regulatory issues in a digital business ecosystem in the EU. Journal of Information Technology, 25(3), 288-307

PS23. Zhu, H., Madnick, S. E., & Siegel, M. D. (2008). An economic analysis of policies for the protection and reuse of noncopyrightable database contents. Journal of Management Information Systems, 25(1), 199-232.

PS24. Watson, R. T., Dawson, G., Boudreau, M. C., Li, Y., Zhang, H., Huong, W., & Aljabri, I. M. (2019). Constraining opportunism in information systems consulting: A three nation examination. Journal of the Association for Information Systems, 20(7), 12.

PS25. Renwick, R., & Gleasure, R. (2021). Those who control the code control the rules: How different perspectives of privacy are being written into the code of blockchain systems. Journal of Information Technology, 36(1), 16-38.

PS26. Thatcher, M. E., & Pingry, D. E. (2009). Optimal policy for software patents: model and comparative implications. Journal of Management Information Systems, 26(3), 103-134.

PS27. Monteiro, L., & Macdonald, S. (1996). From efficiency to flexibility: the strategic use of information in the airline industry. The Journal of Strategic Information Systems, 5(3), 169-188.

PS28. Khan, S. A., & Lacity, M. C. (2014). Organizational responsiveness to anti-offshoring institutional pressures. The Journal of Strategic Information Systems, 23(3), 190-209.

PS29. Sen, R., & Borle, S. (2015). Estimating the Contextual Risk of Data Breach: An Empirical Approach. Journal of Management Information Systems, 32(2), 314–341.

PS30. Jenkins, J. L., Valacich, J. S., Zimbelman, A. F., & Zimbelman, M. F. (2021). Detecting noncompliant behaviour in organizations: How online survey responses and behaviours reveal risk. Journal of Management Information Systems, 38(3), 704-731

PS31. Kim, H., Fox, M. S., & Sengupta, A. (2007). How to build enterprise data models to achieve compliance to standards or regulatory requirements (and share data). Journal of the Association for Information Systems, 8(2), 5.

PS32. Thatcher, M. E., & Clemons, E. K. (2000). Managing the costs of informational privacy: Pure bundling as a strategy in the individual health insurance market. Journal of Management Information Systems, 17(2), 29-57.

PS33. Threlkel, M. S., & Kavan, C. B. (1999). From traditional EDI to Internet-based EDI: managerial considerations. Journal of Information Technology, 14(4), 347-360.

Appendix B - Tabular description of excluded articles in Full text review

	EJIS	ISJ	ISR	JAIS	JIT	Journal of MIS	Journal of Strategic IS	MIS Quarterly
No full text	1	1	2	1	1	5	2	3
Not in scope	1	-	1	1	4	1		1
Empirical but no real-life regulatory context	7	6	9	5	4	10	2	4
Special Issue	-	2	-	1	-	-	1	-
Not empirical	-	2	3	-	4	6	2	-
Regulation mentioned as self-regulatory	-	2	-	-	-	-	-	-
Editorial	-	-	-	2	-	-	-	-
Working Paper	-	-	-	-	1	-	-	-
Case Study	-	-	-	-	-	-	1	-
Article Unavailable	-	-	-	-	-	-	2	1
Total finalized articles	**13**	**3**	**14**	**12**	**22**	**25**	**16**	**5**

Appendix C – Details about the selected primary studies

Reference Number	Reference of article	Policy-cycle Stage	Journal	Themes	Regulation
PS1	Cooper et al. (2017)	Implementation	JIT	Impact	HFT regulation, Securities Act
PS2	Krell and Matook (2009)	Implementation	JSIS	Implementation	SOX, government regulations, privacy
PS3	Hsu et al. (2015)	Implementation	EJIS	Implementation	Taiwanese Regulation, HIPAA
PS4	Oetzel and Spiekermann (2014)	Formulation	EJIS	Compliance	EU Data protection directive, data protection laws,
PS5	Boonstra and Van Offenbeek (2018)	Evaluation	ISJ	Implementation	Tendering Legislation
PS6	Kim et al. (2022)	Adoption	ISJ	Policies	HIPAA, PIPA
PS7	Hui et al. (2017)	Implementation	MIS Quarterly	Compliance	COC

					CDA
PS8	Chan et al. (2019)	Implementation	JIT	Impact	CDA
PS9	De Vaujany et al. (2018)	Implementation	ISR	Impact	DFA
PS10	Kwon and Johnson (2014)	Implementation	MIS Quarterly	Impact	HIPAA, HITECH, Breach Notification Laws
PS11	Hovav et al. (2021)	Implementation	EJIS	Compliance	Cyber Regulation, SOX, GDPR, CCPA, GLB
PS12	Currie et al. (2018)	Implementation	JIT	Impact	Financial regulation, SOX, Securities and
PS13	Currie and Seddon (2017)	Implementation	JIT	Impact	HFT Regulation, Financial Regulation, MIFID.
PS14	Henningsson and Henriksen (2011)	Adoption	JSIS	Compliance	EU Law, Trainsit goods Regulation, national legislation
PS15	Drummer et al. (2017)	Implementation	JIT	Compliance	Financial regulations, securities law,

					Governmental regulation, JOBS
PS16	Jiang et al. (2018)	Implementation	JMIS	Impact	Governmental regulation, JOBS
PS17	Gozman and Currie (2014)	Implementation	JIT	Compliance	MAD, MIFID
PS18	Kwon and Johnson (2013)	Implementation	JMIS	Compliance	HIPAA, HITECH, Security Legislation, State
PS19	Iannacci (2014)	Adoption	JIT	Compliance	CJA, POA
PS20	Steinhauser et al. (2020)	Adoption	JMIS	Impact	Telemedicine Regulation, general data security
PS21	Laffey (2007)	Evaluation	JIT	Impact	Gambling Legislation, Wire Communications
PS22	Tsatsou et al. (2010)	Adoption	JIT	Compliance	EU directives, contract Law
PS23	Zhu et al. (2008)	Formulation	JMIS	Compliance	Database Legislation, intellectual

PS24	Implementation	JAIS	Impact	LARA, Civil law
PS25	Evaluation	JIT	Implementation	AMLD5, GDPR, PSD2
PS26	Implementation	JMIS	Impact	Patent Law, antitrust law,
PS27	Evaluation	JSIS	Impact	Airline deregulation act, civil aeronautics
PS28	Implementation	JSIS	Impact	Anti-offshoring legislation, CAJOA, anti-
PS29	Implementation	JMIS	Impact	FISMA
PS30	Implementation	JMIS	Compliance	FCPA, anti-money laundering legislation
PS31	Implementation	JAIS	Compliance	SOX

Watson et al. (2019) — PS24
Renwick and Gleasure (2021) — PS25
Thatcher and Pingry (2009) — PS26
Monteiro and MacDonald (1996) — PS27
Khan and Lacity (2014) — PS28
Sen and Borle (2015) — PS29
Jenkins et al. (2021) — PS30
Kim et al. (2007) — PS31

		JMIS		Impact	Privacy Legislation
PS32	Thatcher and Clemons (2000)	Implementation	Implementation	Implementation	Internet legislation.
PS33	Threlkel and Kavan (1999)	Implementation	JIT		FASA, EFSEA